KANSAS STATE UNIVERSITY LIBRARY
AUG 10 1959
MANHATTAN, KANSAS

JOURNAL OF SPEECH AND HEARING DISORDERS

VOLUME 24 AUGUST 1959 NUMBER 3

A Journal of the
AMERICAN SPEECH AND HEARING ASSOCIATION

General Information

The American Speech and Hearing Association publishes the *Journal of Speech and Hearing Disorders*, the *Journal of Speech and Hearing Research*, *Monograph Supplements*, *Trends*, and *ASHA*.

The *Journal of Speech and Hearing Disorders* is devoted to articles dealing with techniques of evaluation, clinical research, case studies, therapy and reeducation in disorders of speech and hearing. Manuscripts and related correspondence should be sent to Mary Huber, Editor, *Journal of Speech and Hearing Disorders*, Department of Speech, Los Angeles State College, Los Angeles 32, California. The Association reserves the right to keep any manuscripts and cannot assume the responsibility for their loss. Papers which have been printed elsewhere should not be submitted. Before preparing manuscripts, authors are advised to consult 'Information for Contributors to the *Journal of Speech and Hearing Disorders*,' (*J. Speech Hearing Dis.*, 23, 1958, 14-16). Copies of this note and its supplement, 'Examples of Manuscript Form,' may be obtained from the editor.

Volumes 1-12 appeared under the name of the *Journal of Speech Disorders*. Each volume is indexed. A cumulated index to Volumes 1-15, 1936-1950, appeared as a Supplement to Volume 16 (1), 1951. Beginning with Volume 14, 1949, the *Journal of Speech and Hearing Disorders* has been indexed in the Education Index.

Permission to quote a portion of any article in this issue is hereby granted if permission is also obtained from the author (authors) and if credit is given to the author (authors) and this journal.

Subscription rates are $5.00 a year in the United States; $5.50 a year outside the United States; $1.35 the single copy. Subscription orders and business correspondence should be addressed to Kenneth O. Johnson, Business Manager, *Journal of Speech and Hearing Disorders*, American Speech and Hearing Association, 1001 Connecticut Avenue, N.W., Washington 6, D. C.

The *Journal of Speech and Hearing Disorders* is published annually in February, May, August and November and is printed by Interstate Printers and Publishers, Inc., at 19-27 North Jackson Street, Danville, Illinois. Second-class postage is paid at Danville, Illinois.

KANSAS STATE UNIVERSITY LIBRARY
AUG 10 1959
MANHATTAN, KANSAS

Journal of Speech and Hearing Disorders

August 1959 VOLUME 24 • NUMBER 3

Significance of Neurophysiological Orientation to Cerebral Palsy Habilitation 221
EDWARD D. MYSAK

Speech and Language Development of Athetoid and Spastic Children... 231
MARGARET C. BYRNE

Communication Skills and Intelligence in Right and Left Hemiplegics... 241
DANIEL R. BOONE

Abbreviated Sweep-Check Procedures for School Hearing Testing..... 249
BRUCE M. SIEGENTHALER AND RONALD K. SOMMERS

Screening Tests of Hearing 258
DOUGLAS ANN STEVENS AND G. DON DAVIDSON

Counseling Parents of Stuttering Children 262
ERIC K. SANDER

Double-Syllable Words 272
C. S. BLUEMEL

Creative Dramatics in Speech Correction 275
BARBARA M. MCINTYRE AND BETTY JANE MCWILLIAMS

Clinical Notes

Cybernetics in the Treatment of Voice Disorders 280
WILLIAM M. SHEARER

Group Interview: Initial Parental Clinic Contact 282
D. KENNETH WILSON, HAIM G. GINOTT AND SHIRLEY L. BERGER

Selected Bibliography on Voice Disorders 285
BERNARD A. LANDES

Abstracts 300

Book Reviews 313

News and Announcements 316

The American Speech and Hearing Association

OFFICERS

President
George A. Kopp, Ph.D.
Wayne State Univ.

Executive Vice-President
Jack Matthews, Ph.D.
Univ. of Pittsburgh

Vice-President
Miriam D. Pauls, Ph.D.
Johns Hopkins Med. Instit.

Editor of the Association
Wendell Johnson, Ph.D.
Univ. of Iowa

OFFICERS-ELECT

President-Elect
Stanley Ainsworth, Ph.D.
Univ. of Georgia

Vice-President-Elect
Jack L. Bangs, Ph.D.
Houston Sp. and Hear. Cen.

COUNCIL

The Officers and the following Councilors:

Jon Eisenson, Ph.D.
Ira J. Hirsh, Ph.D., (1958-60)
Ruth B. Irwin, Ph.D., (1956-59)
James Jerger, Ph.D., (1959-61)
Herold S. Lillywhite, Ph.D., (1958-59)
Hayes A. Newby, Ph.D., (1957-59)
Wilbert L. Pronovost, Ph.D., (1958-60)
Sylvia O. Richardson, M.D., (1957-59)
Dean E. Williams, Ph.D., (1959-61)

EXECUTIVE SECRETARY
Kenneth O. Johnson, Ph.D.

The Journal of Speech and Hearing Disorders

EDITOR
Mary Huber, Ph.D.

ASSISTANT TO THE EDITOR
Beryl Scott, M.A.

SECRETARY TO THE EDITOR
Claudia Fahringer

STATISTICAL CONSULTANT
Solomon Diamond, Ph.D.

ASSOCIATE EDITORS
Moe Bergman, D.Ed.
McKenzie Buck, Ph.D.
Melba Hurd Duncan, Ph.D.
Victor Garwood, Ph.D.
William G. Hardy, Ph.D.
Harriet Kopp, M.A.
Helen Sullivan Knight, M.A.
G. Paul Moore, Ph.D.
Joseph Sheehan, Ph.D.
Mildred C. Templin, Ph.D.
Dean E. Williams, Ph.D.
Kenneth Scott Wood, Ph.D.

DEPARTMENT EDITORS

Ernest H. Henrikson, Ph.D.
Book Reviews

Esther L. Herbert, M.A.
Clinical Notes

Martin F. Palmer, Sc.D.
Records

Phillip A. Yantis, Ph.D.
Abstracts

BUSINESS MANAGER
Kenneth O. Johnson, Ph.D.

APPLICATIONS FOR MEMBERSHIP SHOULD BE ADDRESSED TO THE EXECUTIVE SECRETARY

Significance Of Neurophysiological Orientation To Cerebral Palsy Habilitation

Edward D. Mysak

As a consequence of the limited and rather discouraging results of conventional treatments for the cerebral palsied, there has been a steadily growing interest in seeking new and better ways of assisting these children. An outstanding development of this interest has been the attempt by different individuals to apply neurophysiological theory to such habilitation; these approaches include selective ablation surgical techniques (*22*), drugs (*21*) and various neurophysical therapies (*15, 17, 23*).

Because of the stimulating rationale behind the neurophysical therapies, the writer was motivated to study the orientation's philosophy and significance. During the exploration, it became evident that many of the principles inherent in these approaches might be of general importance to all therapists working with cerebral palsied children. The therapeutic concepts of the Bobaths (*2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13*)[1] were especially provoking and, consequently, the discussion will revolve about their particular ideas.

The specific purpose of the paper is to compare the conventional and neurophysiological philosophies in the treatment of spastic cerebral palsy and to emphasize and develop the especially interesting concepts of the latter.

General Comparisons

Conventional. The 'treatable' types of cerebral palsy are mainly those often referred to as the residue of destructive processes group. They may be described as representing disease complexes which have their inception in prenatal, natal or early postnatal life. They reflect static damage of multiple causation to cortical and/or subcortical areas, which appear in the form of varying degrees and types of neuromuscular, sensory and behavioral disorders. Basically, the conventional approach to cerebral palsy habilitation reflects this definition and its acceptance of the fundamental irreversibility of the C.N.S. lesion and its effects. Accordingly, treatment is primarily designed to help the child make the best possible use of his abnormal motor patterns.

In combination with direct teaching of motor developmental tasks (opposed to natural process) is the utilization of special devices, braces, *etc.*, that is, the principle of adjusting the environment to the child's abnormal motor patterns. Furthermore, since the constant use of abnormal motor pat-

[1]A pilot study of this approach is presently in progress at the Newington Hospital for Crippled Children. As a part of this exploratory investigation, the writer has prepared a film, *The Bobath Approach to Cerebral Palsy Habilitation,* which is available upon request.

Edward D. Mysak (Ph.D., Purdue University, 1958) is an Instructor of Speech at the University of Connecticut and Director of Speech Education at the Newington Hospital for Crippled Children.

terns is likely to result eventually in secondary muscle and bone deformities (the extended use of an asymmetrical tonic neck reflex may result in flexor contractures on one side and extensor contractures on the other), orthopedic surgery becomes a familiar concomitant to the general habilitative program.

Neurophysiological. A neurophysiologically based definition (7) might describe cerebral palsy as a lesion which, to a large extent, causes the release of primitive reflex patterns of posture and movement from the inhibition normally exerted by higher centers of the C.N.S. Therefore, cerebral palsy may be seen basically as a manifestation of phylogenetically older postures and movements combined with abnormal muscle tone. The possibility of associated primary and secondary sensory and behavioral aberrations is also implied in this definition.

According to this view, degrees of cerebral palsy may be classified under at least three general categories:

1. Apedal. Children who are basically prone or supine-lying creatures and reflect a predominance of (a) spinal reflexes [Sherrington's (*25*) 'spinal animal'], such as the flexor withdrawal, extensor thrust and crossed extension reflex which are mediated by areas of the C.N.S. up to the base of the fourth ventricle, or (b) brain stem reflexes [Sherrington (*25*) and Magnus' (*18*) 'brain stem animal'], such as the symmetrical and asymmetrical tonic neck reflexes, tonic labyrinthine reflexes, positive and negative supporting reactions and associative reactions (*28*) mediated by areas between the eighth nerve to below the red nucleus (lowest of postural reflexes).

2. Quadripedal. Children who are basically four-limbed creatures and show a predominance of righting reflexes [Magnus' (*18*) 'midbrain or thalamic animal'], such as the neck righting reflexes, the labyrinthine righting reflexes acting on the head, the body righting reflexes acting on the head and the body and the optical righting reflexes mediated by areas above the red nucleus.

3. Bipedal. Children who can assume the human standing posture, can ambulate and reveal equilibrium reactions. These reactions reflect the efficient interplay of the cortex, basal ganglia and cerebellum and occur only when muscle tone is normal [Weisz's (*29*) 'complete animal']. This mechanism provides for body adaptation in response to a change in the center of gravity of the body. For example, if an individual is placed in a supine or prone position on a table and then tipped laterally, an extension of the extremities, *i.e.*, an increase of support tonus, to the side of the tipping may be seen.

As concerns the child with cerebral palsy, clinical experience usually reveals various degrees and combinations of the above described levels of phylo-ontogenetic reflexive maturation.

With this definition in mind, support for one type of neurophysiological approach to therapy (7) is based on at least five principles:

1. The C.N.S. can be externally influenced. Magnus' (*19*) 'Law of Shunting' states that at any moment the C.N.S. reflects the state of the body musculature. In other words, the state of contraction and elongation of muscles determines the distribution of excitatory and inhibitory processes within the C.N.S. and the subsequent efferential outflow. Therefore, it becomes apparent that afferent inflow will favor the contraction of elongated muscles. The cerebral palsied child's motor patterns reflect the

shunting of the afferent inflow into the few synaptic channels established by the dominance of the spinal, brain stem and midbrain levels.

This concept suggests the course that a neurophysiological treatment could take. For example, if shunting can be externally influenced, then therapists might concentrate on effecting new and additional shuntings of afferential inflow by manipulating the body musculature. This, in turn, should result in greater possibilities for new and different efferential outflows. Essentially, this describes one aspect of the Bobath approach.

2. Cerebral palsied children usually have more motor potential than they manifest. Since the lesion in cerebral palsy may be seen as one which reflects the disturbance of upper center inhibitory control over lower centers, resulting in primitive sensory shunting and abnormal muscle tone, righting and equilibrium reactions, though potentially present to varying degrees depending on the severity of the lesion, may not be seen. In other words, centers for advanced motor patterns, though undamaged, are prevented from emerging when primitive shunt-

TABLE 1. Reflexive maturation and concomitant motor manifestations.

Age	*General Reflexes (9)*	*Motor (16)*	*Oral Reflexes (18)*	*Speech (1)*
1-4 wk.	Neck Right: present Asymm. T. N.: varies Moro: strong	Head erect Prone: 1 to 3 mo.	Biting, sucking, swallowing, regurgitation: at birth	Reflexive Vocalization: 0 to 1 mo.
2 mo.	Labyrinth. R. on head: present Neck Right: present Moro: present	Supine: 4 to 6 mo.		Babbling: 1 to 6 mo.
4-6 mo.	Labyrinth. R. on head: gains Moro: diminishing Landau: commences Protect. Ext. of arms: strong	Reaching: 3 to 5 mo.	Mouth-opening: upon seeing breast or bottle, Biting and suck.: can be inhibited at 4 mo.	Lalling: 6 to 10 mo.
7-12 mo.	Asymm. T. N.: present in few Landau: more frequent Body R. on body: established in some Protect. Ext. of arms: present	Crawling: 7 to 8 mo. Sitting: 8 to 10 mo.	Bites hand and objects brought to mouth: 5 mo. Chewing begins: 7 mo.	Echolalia: 10 to 12 mo.
12-14 mo.	Asymm. T. N.: disappears Landau: present in 12/13 Neck Right: doubtful in some Protect. Ext. of arms: present Body R. on body: change to transitional form	Standing: 12 to 13 mo. Walking: 12 to 18 mo.		First True Words: 12 to 18 mo.
2-3 yr.	Neck Right: present in 11/19 Landau: disappears Protect. Ext. of arms: present Body R. on body: ½ use transitional form			

ing and heightened muscle tone characterize a system.

3. Cerebral palsied children usually have more sensory response capacity than they manifest. The cerebral palsied may reflect below actual potential sensory response capacity because of the primitive shunting or short circuiting of sensory inflow. In addition, proprioceptive aberrations, due to sensory inflow distortion caused by muscle hypertonicity, are also present. Since reactions to stimuli, or motor acts, are usually not directly learned but only their associated sensations, the cerebral palsied child's retention or learning potential may also be affected. Sensory feedback monitoring too is involved, since it is known that the proprioceptors are essential in the guidance of movements excited by the exteroceptors (27).

4. Motor developmental tasks emerge as a function of reflexive mechanism maturation. Before a child learns to engage in various volitional activities, he receives great quantities of afferential stimuli (rocking, mother's handling in feeding, washing, dressing, changes in spatial position while carried and played with, *etc.*) which contribute to C.N.S. maturation. It is the combination of this sensory stimulation and C.N.S. maturation that eventuates in the appearance of such motor developmental tasks as sitting, standing, walking and talking.

Emphasis in neurophysiological habilitation, therefore, is on the excitation of all the reflexive maturational potential that each child contains. Table 1 represents a composite table of progressive reflexive or C.N.S. maturation and the concomitant motor manifestations. For example, standing by 12 or 13 months is dependent not on direct parental teaching but, rather, on the breaking up or inhibiting of primitive tonic reflexes and the development of righting reflexes. Speech and language are also seen to follow the same basic pattern, *i.e.*, the disintegration of primitive oral reflex activity and the development of higher integrated oral motor activity. The shift of focus in therapy, then, is on stimulating reflexive maturation and automatic movement reactions rather than on directly teaching volitional and refined motor tasks.

5. Motor task assimilation depends on the establishment of certain higher chain synaptic arrangements. Russell (*24*) stated that there seems to be a fundamental tendency for nerve cells to repeat patterns of activity and that this tendency to repeat is apparently one of the most powerful features of all nervous functioning. The C.N.S.'s characteristic of developing and establishing particular chain synaptic pathways for various motor activities reflects itself in the similarity of our sitting, standing and walking motor patterns. Therefore, if new automatic movements can be stimulated and if these are repeated frequently, there is every likelihood that these responses will be repeated in the future. This is especially true if these responses belong to phylogenetically inherent patterns (human heritage) like the righting and equilibrium reactions. These new responses, once excited, would tend to persist not because of the child's ability to remember them but because of the newly stimulated chain synaptic connections.

In addition, maturational processes indicate that permanent assimilation of refined motor activity is also dependent on the excitation of the higher reactions, for these are the reactions which are responsible for modifying and inhibiting tonic and spinal reflexes and for regularizing muscle tone. In

the normal, higher reactions develop as a result of maturation and stimulation; in the cerebral palsied, they result from provocation of maturational potential and stimulation.

With the preceding discussion serving as pertinent background, a general discussion of the Bobaths' therapeutic goals will follow. Further details may be found by exploring the listed references.

Bobath therapy is fundamentally a tactile-proprioceptive approach designed to actualize the frequently unmanifested, but potentially present, higher motor mechanisms. In addition, it also tends to minimize secondary deficits resulting from distorted sensory feedback. Essentially, the approach includes the following steps: (1) motor desynthesis, or the reduction of muscle tone and the excitation of new shunts to facilitate the eventual disintegration of tonic level motor stereotypes, (2) motor elaboration, or the stimulation of new motor activities, *i.e.*, automatic righting and equilibrium reactions, and (3) motor resynthesis, or the use of these additional motor behaviors in the development of volitional and refined motor activities.

Steps in Treatment

Analysis. Each individual is studied from the viewpoint of reflexive maturational level, *i.e.*, his muscle tone and types of primitive reflexes manifested in supine-lying, prone-lying, sitting, *etc.* (spasticity will be seen to shift depending on limb position or position of the body in space). Appropriate neutralizing reflex inhibiting postures are designed on the basis of these observations.

R.I.P.'s or Reflex Inhibiting Postures. R.I.P.'s are based on the positioning of body parts into postures which tend to neutralize the effects of primitive tonic reflex activity (taking advantage of the refractory period of muscle action potential and the Law of Shunting). These counteracting postures have been observed to reduce muscle tone and to provide a means of shunting excitatory and inhibitory processes of the C. N. S. The special manipulation of the body musculature results in opening new shunts, and hence in making possible new postures and movements. The aim is to shunt beyond the primitive sensory pathways, effect new postures and to excite balance and righting reactions necessary to maintain these new postures. Furthermore, R.I.P.'s are attitudes from which new movements can be initiated and also represent intermediate stages from one motor position to another.

In essence, R.I.P.'s represent abnormal posture reversals, *i.e.*, flexion patterns are changed to extension, abduction to adduction, *etc.* The greatest effect of this shunting is obtained from the major joints of the body (spine, shoulders and hips). For example, in supine-lying the tonic labyrinthine reflex produces maximal extensor spasticity, manifested by a retraction of the head and shoulder girdle, with extension, adduction and inward rotation of the legs and plantar flexion of the feet. The neutralizing R.I.P. consists of (1) bringing the head into the midline and ventroflexing it, (2) bringing the arms forward and crossing them over the chest, and (3) flexing the legs at the knees and hips and abducting them.

Theoretical support for the effects of an R.I.P. is based on the fact that abnormal posture reversal elongates muscles which were in spastic contraction and, therefore, according to the Law of Shunting, this positioning pro-

duces an outflow of excitation into the elongated or originally spastic muscles, or the excitatory phase. This excitatory phase is opposed (contraction of originally spastic muscles is prevented) by the therapist and is subsequently followed by the post-excitatory inhibition stage (refractory period of muscle action potential), and muscle tone becomes more normal. The inhibitory period is initially short and is followed by gradually increasing tension, or the post-inhibitory exhaltation stage. The therapist again opposes the contraction tendency and inhibition is restored. Repetition of inhibition gradually lengthens the state of comparative normalcy of muscle tone. In addition, as treatment progresses, R.I.P.'s are modified; and with this continual introduction of new combinations of flexor and extensor patterns, primitive shunts progressively deteriorate and new shunts are opened. Efferential outflow is thereby redirected into channels of potential motor activity previously unused because of the dominance of tonic reflex patterning. Depending on the severity of the problem and the level of treatment, the sequence of R.I.P.'s might be as follows: (1) they are imposed on the child; (2) the child learns to tolerate and adjust to them (externally influenced inhibition); (3) the child learns to maintain them (internally influenced inhibition); and, finally, (4) the child learns to assume them (new volitional movements).

Activation of Higher Integrated Movement Reactions. The attempt at activating the cerebral palsied child's potential for higher integrated movement reactions is done by a technique known as facilitation. The goal of facilitation is to obtain spontaneous movement responses from the child by special handling. For example, side-lying can be facilitated by first placing the child in an appropriate R.I.P., thereby normalizing muscle tone, and then turning the child's head to one side, consequently stimulating neck proprioceptors. This, in turn, excites the neck righting reflex (head turned to one side, body follows as a whole). Movement responses such as these are firmly established by repetition (*24*). As previously discussed, assimilation depends on the extent to which higher reactions can be facilitated and their synaptic bonds firmly established.

Once higher postural reactions are firmly established, treatment can safely proceed to the development of desired volitional and refined motor activities. (In conventional therapies, the first step is usually disregarded.) This sequence is based on the observation that in the normally developing C.N.S., the upright posture, with its necessary balance reactions, precedes, to a great extent, this type of motor function.

In substance, the neurophysiological approach in cerebral palsy is based on (1) manipulating the body musculature in such a manner as to regularize muscle tone and influence the distribution of excitatory and inhibitory processes in the C.N.S. (R.I.P.'s and Law of Shunting), (2) carefully exciting the C.N.S.'s remaining potential for normal automatic movements (facilitation), (3) maintaining these new movements by repetition (Russell's physiology of memory) and, finally, (4) progressing from automatic movements to volitional and refined motor activities.

The practical as well as theoretical implications that this orientation has for speech and language habilitation will be discussed in the concluding section of this paper. Only a general outline for speech habilitation will be described; for further details see Marland (*20*) and Crickmay (*14*).

General Approach

R.I.P.'s. Therapy begins after the child exhibits the capacity to respond adequately to at least two or three reflex inhibiting postures. This first phase of therapy implies that the child can now maintain, for a working period of time, a state of comparative normalcy of muscle tone and, consequently, is capable of experiencing more normal tactile and proprioceptive inflows. The great importance of adequate sensory feedback to speech therapy is generally appreciated.

Desensitization and Dissociation. Depending on the severity of the involvement, the second phase of therapy entails dissociating the head and neck from the rest of the body. It is accomplished by passively moving the head and neck through various positions while the child is in an R.I.P. This eventually leads to spontaneous activity of the head and neck without associated movements. Subsequently, various parts of the speech mechanism are similarly dissociated from the head and neck. In addition, desensitization of various parts of the total speech mechanism is also necessary. For example, the child must learn to tolerate the handling of the neck, chest, jaws, chin and gums. Such primitive reactions as mouth opening in response to visual and tactual stimuli, jaw deviation when the corner of the mouth is stimulated, and chewing movements when the teeth are stimulated must be, and usually can be in a comparatively short time, inhibited. In essence, this is done by stimulating these different areas with the child's own fingers and then resisting the expected primitive reaction.

Preparation for Phonation. The therapist may positively condition the upper and lower lips by moving or shaking them with a rapid front-to-back oscillating motion. Cheeks can be conditioned by placing the thumb in the buccal area between the cheek and the molars and moving the thumb in various directions; jaw and lingual loosening is also done.

Facilitation of Phonation. After the aforementioned procedures have been executed and while the child is in an R.I.P. position which is most conducive to phonation (varies from person to person), activities designed to excite phonation are begun. Since the normal infant usually first vocalizes in the supine-lying posture, this particular speech R.I.P. is most often used. (Child is supine with flexed abducted knees, shoulders flexed and raised forward on therapist's arms with the head falling back.) Voicing is elicited by vibrating the upper chest with an extended hand while the therapist vocalizes the desired sound. After a period of time, spontaneous vocalization follows. It should be mentioned that automatic vocalization may be frequently heard upon R.I.P. imposition alone. Facilitation techniques also stimulate more efficient speech respiratory patterns and tend to check secondary respiratory involvements due to muscle disuse and prone or supine-lying gravitational effects on the thoracic cage (flattening).

Facilitated Babbling. Once spontaneous voicing is established, babbling is superimposed onto the voicing. R.I.P.'s may vary depending on the consonant being facilitated. These techniques are similar to Young's (*30*) approach. Bilabials [p], [b] and [m] are imposed onto the sustained phonation by rhythmic movements of three fingers lifting the lower lip to the upper lip while the thumb remains under the chin; labiodentals are similarly facilitated except that the upper

lip is held back while the lower lip is brought against the upper teeth; alveolar consonants are facilitated by upward pressure exerted posterior to the mandibular symphysis; and, finally, velar consonants are facilitated by a sharp rhythmic pressure under the chin below the back of the tongue.

The remaining treatment sequence includes facilitated simple words and phrases, spontaneous words and phrases with conversational patterns subsequently developing.

Theoretical Pertinence

The neurophysiological orientation provokes the consideration of many important fundamental concepts relative to speech and language habilitation of children with C.N.S. involvements. Only a few of the more interesting concepts will be discussed here.

Holism. Propositional oral communication development parallels C.N.S. reflexive mechanism maturation which makes bipedal activities possible (see Table 1). That is, efficient propositional motor speech, being one of the most highly skilled neuromuscular activities, all other essential factors being equal, depends on bipedal head, neck and trunk balance and bipedal respiratory activity. Therefore, ideally, the speech therapist should analyze his child from the point of view of reflexive maturation and set his therapy goals accordingly. For example, Table 1 indicates that apedal children may be expected to vocalize reflexively and to babble. Therefore, these should be the therapist's goals until a higher level of motor activity is reached by the child (the approach necessitates the close integration of occupational, physical and speech therapies). This concept is often violated by conventional speech therapy which usually aims at stimulating propositional speech in keeping with the chronological age of the child.

Sensory Feedback. Since it was indicated that released lower motor mechanisms result in abnormal tone and that abnormal tone may result in proprioceptive feedback distortion, it is apparent that the cerebral palsied child, who is treated without regard for increased muscle tone and primitive sensory shunting patterns, may experience secondary sensory involvements (besides the possible primary sensory deficits due to the fundamental lesion). Conventionally, speech therapists may work with an apedal cerebral palsied child who is tied in a wheelchair, with head slumped and with varying degrees of thoracic and abdominal compression, and attempt to stimulate speech. In this situation, such attempts are usually associated with increased spasms, which, in turn, encourage various kinds of secondary muscle-bone deformities as well as the secondary sensory aberrations mentioned. More specifically, working with children who are experiencing spasms might also encourage certain secondary auditory acuity deficits associated with spasms of the tensor tympani and stapedius muscles. In addition, since it was pointed out that organisms do not learn movements but only sensations of movements, teaching of various articulatory activities without regard for the secondary movement feedback distortion would appear to be contraindicated.

In line with this discussion, spastic dysarthria may now be viewed not only as a primary involvement of the upper motor neurone but also as a reflection of delayed, or disturbed, oral reflexive maturation. A child should not be expected to articulate well while his oral motor activities

are influenced by primitive mouth-opening, chewing and laughing reflexes. Similar primitive reflex influence is apparent when observing the cerebral palsied child's respiratory and phonatory patterns.

Perceptual Development. Strauss (*26*) has indicated that the development of an adequate body schema, or self-concept, forms the basis of future perceptual and conceptual growth; however, it is also known that adequate body schema development is a function of moving normally. On the basis of what has been stated previously, it becomes apparent that the cerebral palsied child may also suffer secondary perceptual and conceptual aberrations.

This suggests an interesting analogy between the Bobath approach to the dramatically motor involved cerebral palsied child and Strauss' (*26*) approach to the dramatically perceptually involved child ('Strauss Syndrome'). In both instances, untapped potential is recognized. In the Bobath approach, higher motor activities are often seen when the child is placed in an R.I.P. and muscle tone is made more normal; in the Strauss approach, a more integrated type of behavior is often seen when the child is placed in an environment that counteracts his tendency toward distractibility, disinhibition, catastrophic response, *etc.* (organic behavioral aberrations). Again, in the Bobath approach, higher motor mechanisms are facilitated by special handling and stimulation; in the Strauss approach, visual perceptual capacity is developed by stimulating the child with special materials, *e.g.*, the use of larger letters, color association, tactile and kinesthetic supplementation, and reducing figure-ground disturbances. In substance, both orientations recognize released lower phylo-ontogenetic behaviors (motor and perceptual) that prevent potentially present higher behaviors from emerging. Both approach their respective problems from the point of view of initial external control over these released lower behaviors, allowing the higher potentials to emerge and subsequently working toward stimulating eventual self-control and development in the child.

In conclusion, a good deal of the cerebral palsied child's speech and language deficits may be seen as a reflection of disturbed phylo-ontogenetic C.N.S. maturation. It has been shown that this situation may release secondary primitive respiratory, phonatory, articulatory and perceptual patterns. Consequently, as with the general neurophysiological approach, the goals in speech therapy should be to suppress the primitive reflexes, regulate tone and excite all the potential for higher kinds of oro-neuromotor activities that each child may possess.

Summary

The steadily growing interest in applying neurophysiological theory to cerebral palsy habilitation was indicated. A general outline and the theoretical rationale for the Bobath approach were specifically described, and wherever appropriate, comparisons were made between conventional and neurophysiological concepts. A discussion of the general approach to speech therapy was presented and the orientation's theoretical implications to speech and language habilitation were emphasized.

References

1. Berry, M. F., and Eisenson, J., *Speech Disorders: Principles and Practices of Therapy.* New York: Appleton-Century-Crofts, Inc., 1956.

2. Bobath, B., Control of postures and movements in the treatment of cerebral palsy. *Physiotherapy*, 39, 1953, 99-104.
3. Bobath, B., The importance of the reduction of muscle tone and the control of mass reflex action in the treatment of spasticity. *Occup. Ther.*, 27, 1948, 371-383.
4. Bobath, B., A new treatment of lesions of the upper motor neurone. *Brit. J. of phys. Med.*, 2, 1948, 26-29.
5. Bobath, B., A study of abnormal postural reflex activity in patients with lesions of the central nervous system. Parts 1-4. *Physiotherapy*, 40, 1954, 259-267, 295-300, 326-334, 368-373.
6. Bobath, B., The treatment of motor disorders of pyramidal and extra-pyramidal origin by reflex inhibition and by facilitation of movements. *Physiotherapy*, 41, 1955, 146-153.
7. Bobath, K., The effect of treatment by reflex-inhibition and facilitation of movement in cerebral palsy. Address given at the Neurological Clinic, The Academisch Ziekenhuis, Leiden, Holland, March 3, 1958.
8. Bobath, K., and Bobath, B., Spastic paralysis; treatment by the use of reflex inhibition. *Brit. J. phys. Med.*, 13, 1950, 121-127.
9. Bobath, K., and Bobath, B., Tonic reflexes and righting reflexes in the diagnosis and assessment of cerebral palsy. *Cerebral Palsy Rev.*, 16 (5), 1955, 4-10.
10. Bobath, K., and Bobath, B., A treatment of cerebral palsy based on the analysis of the patient's motor behavior. *Brit. J. phys. Med.*, 15, 1952, 107-117.
11. Bobath. K., and Bobath, B., Control of motor function in the treatment of cerebral palsy. *Australian J. Physiother.*, 2 (2), 1956, 75-85.
12. Bobath, K., and Bobath, B., Treatment of cerebral palsy by the inhibition of abnormal reflex action. *Brit. orthop. J.*, 11, 1954, 1-11.
13. Bobath, K., and Bobath, B., (Notes taken by the author of this paper at a short course on the Bobath Approach at the D. T. Watson School of Physiatrics, Pittsburgh, Pa., May, 1958.)
14. Crickmay, M., *Description and Orientation of the Bobath Method with Reference to Speech Rehabilitation in Cerebral Palsy*. Chicago: National Society of Crippled Children and Adults, 1956.
15. Fay, T., Neurophysical aspects of therapy in cerebral palsy. *Arch. phys. Med.*, 29, 1948, 327-334.
16. Gesell, A. L., et al., *The First Five Years of Life*. New York: Harper and Bros., 1940.
17. Kabat, H., Central facilitation; the basis of treatment for paralysis. *Permanente Foundation med. Bull.*, 10, 1952, 190-204.
18. Magnus, R., Some results of studies in the physiology of posture. *Lancet*, 2, 1926, 531-535.
19. Magnus, R., *Koerperstellung*. Berlin: Springer, 1924.
20. Marland, P. M., Speech therapy for the cerebral palsied based on reflex inhibition. In C. Van Riper (ed.), *Speech Therapy*. New York: Prentice-Hall, 1953.
21. Mautner, H., Drug therapy in cerebral palsy. *Arch. Pediat.*, 73, 1956, 351-381.
22. Meyers, R., Results of bilateral intermediate midbrain crusotomy in seven cases of severe athetotic and dystonic quadriparesis. *Amer. J. phys. Med.*, 35, 1956, 84-105.
23. Rood, M., Neurophysiological reactions as a basis for physical therapy. *Phys. Therapy Rev.*, 34, 1954, 444-449.
24. Russell, W. R., The physiology of memory. *Proc. roy. Soc. Med.*, 51, 1958, 9-14.
25. Sherrington, C. S., *Selected Writings*. (D. Denny-Brown, ed.). Hamish Hamilton Medical Books, London, 1939.
26. Strauss, A., and Kephart, N. C., *Psychopathology and Education of the Brain-Injured Child, Vol. II*. New York: Grune and Stratton, 1955.
27. Twitchell, T. E., Sensory factors in purposive movement. *J. Neurophysiol.*, 17, 1954, 239-252.
28. Walshe, F. M. R., On certain tonic or postural reflexes in hemiplegia with special reference to the so-called associated movements. *Brain*, 46, 1923, 1-37.
29. Weisz, S., Studies in equilibrium reaction. *J. nerv. ment. Dis.*, 88, 1938, 150-162.
30. Young, E. H., and Hawk, S. S., *Moto-Kinesthetic Speech Training*. Stanford, California: Stanford University Press, 1955.

Speech And Language Development Of Athetoid And Spastic Children

Margaret C. Byrne

The speech and language development of children with a diagnosis of cerebral palsy is the primary concern of many parents and speech therapists. Parents who recognize that oral communication offers their child the only avenue for modifying his environment are likely to stress the urgency of early speech training. Speech therapists who undertake the rehabilitation of these children often become discouraged by the many cases whose progress is extremely limited.

Studies have indicated that speech and language develop slowly among this group. Although retarded, acquisition of language and articulatory skill follows the same sequential pattern observed in normal children. Denhoff and Holden (*1*) reported that among 100 cerebral palsied children single words appeared at an average age of 27 months, and the mean age for using two- and three-word sentences was 37 months. When this group is compared with normal children, approximately a one-year delay in the appearance of single words, and a six-month delay in the use of sentences, is apparent. Irwin (*2*) found an increase with age in the types and frequency of vowels and consonants in the utterances of both normal and cerebral palsied children. The pace of the former, however, far surpassed that of the cerebral palsied group. In a study of educable quadriplegics who ranged in age from eight through 14 years, Lencione (*3*) concluded that her oldest age group came close to the consonantal competency of normal eight-year-olds. Less than three-fourths of her oldest group, however, had attained the proficiency which can be demonstrated by more than 90 per cent of the eight-year-old population.

This study was undertaken in order to provide additional information about the communication of young athetoid and spastic quadriplegic children. The article will present the results of tests of articulation and information concerning certain language items. The influence of age and type of cerebral palsy on the performance of the group will be considered.

Population

The population consisted of all the athetoid and spastic quadriplegics who met the following criteria. They were either private or clinic patients of the

Margaret C. Byrne (Ph.D., Northwestern University, 1958) is Director of the Speech and Hearing Clinic, University of Kansas. This article is based in part on a doctoral dissertation completed under the direction of Professor Harold Westlake. Data were gathered while the author was a Research Fellow of the National Institute of Neurological Diseases and Blindness, U.S. Department of Health, Education and Welfare. Part of the article was presented at the 1957 Convention of the American Speech and Hearing Association in Cincinnati.

TABLE 1. Numbers and percentages of children given tests requiring oral or gesture language.

Group	Oral Test		Gesture Test	
	N	%	N	%
Athetoids	29	78.4	8	21.6
Spastics	32	84.3	5	15.5
Total	61	82.4	13	17.6

two medical consultants.[1] They ranged in age from two through seven years, had no detectable hearing losses, and had been evaluated as educable by qualified psychologists. Since the psychologists were accustomed to testing cerebral palsied children, they provided as much opportunity for success as the tests would allow. If the I. Q. scores of a child fell below 60, the child was not accepted for this study.

The final group consisted of 74 children, half of whom had been diagnosed as spastics and the rest as athetoids. Each of the six age groups had a minimum of nine children. Of the 74 children, 23 were evaluated as mild, 24 as moderate, and 27 as severe by the medical consultants who used Perlstein's designations of severity of involvement (*5*). Fifteen were considered retarded, 16 dull normal, 33 average, and nine above average.

Tests

Two types of tests were utilized. The gesture language test consisted of 10 questions which permitted the child to designate his answers by various body postures or movements. The oral response test required that the child name selected toys either with or without stimulation. One toy was presented for each of the 81 phonetic units which were evaluated. It was possible for each child to give seven vowel, five diphthong, 60 consonantal, and nine consonant blend responses. The 60 consonants included 22 initial, 19 medial, and 19 final sounds. Speech sounds were tested in the following order: vowels, diphthongs, initial, medial and final consonants, and consonant blends.

Interviews

During the interviews information was obtained about the development of language and the current status of the child's oral communication in the home. Since parents tend to be unreliable in providing data about the ages at which certain skills are manifested by their children, a request was made that the parents bring their child's baby book to the interview. When no information was found in the baby book and the parents were not able to recall with any measure of certainty the age at which the child used the language items, no answers were recorded. As a result, complete information was not obtained for all children. Parents were questioned about the ages at which the child spoke single words, two words together in sentences, and three-word sentences. They were also asked to designate on a five-point scale how much of the child's verbalization was understood currently by the members of his family.

Results

Identification of Oral and Gesture Language Groups. Two criteria were utilized in determining those children to whom the gesture and the oral sections of the speech test should be administered. When the parents indicated that the child had less than 20 words

[1]Dr. Meyer Perlstein and Dr. Raymond Waisman, members of the American Academy of Cerebral Palsy.

TABLE 2. Percentages of children given the oral and gesture tests according to age groups.

Test	*Age*					
	Two N=9	*Three N=10*	*Four N=14*	*Five N=12*	*Six N=16*	*Seven N=13*
Oral	44.5	80.0	78.6	91.7	93.8	92.4
Gesture	55.5	20.0	21.4	8.3	6.2	7.6

or word approximations and depended upon a gesture language and when the examiner failed to obtain verbal responses to a few toys, the child was given the gesture test. The test requiring oral responses was administered to the others.

The oral test was given to 61 children, and the gesture test to 13. As Table 1 indicates, 29 athetoids and 32 spastics gave oral responses to the toys. Eight athetoids and five spastics gave non-oral replies to the questions presented.

In order to determine whether or not the difference in the numbers of athetoid and spastic children who responded to the oral test was due to chance, the chi-square test was applied (*6*). The chi-square value of .83 is not significant at the .05 level or less. Type of cerebral palsy apparently was not a factor in determining whether these children used gestures or oral language as their primary method of communication.

Table 2 shows the percentages of children in each age group who responded to the two forms of the speech test. In each of the older groups a trend was noted toward increase in the percentages of children who responded orally. At least 78 per cent of those above age three and 91 per cent of those between the ages of five and seven used oral language.

Some children in each age group, however, were dependent upon a gesture language as their chief method of communication. Although more than one-half of the two-year-olds in the study were using gestures, fewer older children relied upon this type of response. About 20 per cent of the three- and four-year-olds and no more than eight per cent of the children in the three oldest groups used gestures as their primary method of expressing their needs.

TABLE 3. Mean responses to toys used to evaluate production of 81 sounds.

Age	*Athetoids*			*Spastics*		
	Vowels, Diphthongs (12)	*Consonants (60)*	*Blends (9)*	*Vowels, Diphthongs (12)*	*Consonants (60)*	*Blends (9)*
Two	3.5	3.0	0.0	4.6	6.3	0.0
Three	10.0	37.0	5.0	12.0	56.4	8.2
Four	11.0	51.0	6.7	11.7	59.4	9.0
Five	11.7	48.7	7.2	11.8	59.4	9.0
Six	11.8	57.3	7.5	12.0	59.7	9.0
Seven	12.0	55.1	8.0	12.0	60.0	8.8

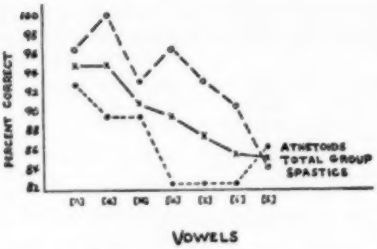


FIGURE 1. Percentages of correct responses for the seven vowels.

Responses of the Oral Language Group. The toys did not bring responses from all children. Table 3 shows the mean number of tested sounds elicited by the toys. Two-year-olds gave few responses. The older groups were able to cooperate more than the younger ones. The range of mean responses for the five oldest groups was minimal for the vowels, wider for the consonants, and widest for the consonant blends. Spastics gave more answers than the athetoids.

Accuracy of Production of Vowels and Diphthongs. Figure 1 shows the percentages of correct vowel responses for the athetoid, spastic and combined groups. Vowel patterns were close to normal. Total responses ranged from 85 to 95 per cent for the seven vowels.

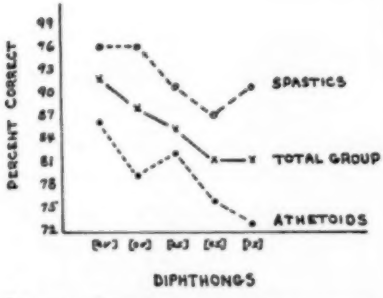


FIGURE 2. Percentages of correct responses for the five diphthongs.

The vowels which required neutral tongue positions such as [ʌ] and [a] were produced accurately more frequently than those which utilized the tongue-tip. The spastics had higher scores than the athetoids in six of the seven vowel categories, scoring above 90 per cent on all vowels except the [ɛ]. Athetoids produced the [ʌ] correctly 93 per cent of the time, the only one they used accurately more than nine out of 10 times.

The percentages of correct diphthong responses for the athetoid, spastic and combined groups are given in Figure 2. Although no diphthong was produced correctly by all of the children, proficiency in the use of diphthongs also was high and was close to normal. The range of total correct responses was from 81 per cent for [eɪ] and [ɔɪ] to 91 per cent for the [aʊ]. At least 85 per cent of the time the spastics provided correct answers. The athetoids, however, produced only one diphthong correctly at this level of accuracy.

In order to determine whether or not the differences in the number of correct responses for each vowel and diphthong for the spastics and athetoids were due to chance, the chi-square test was employed (*6*). None of the 12 chi-square values are significant at the .05 level or less. Although it might appear from the figures that the spastics were performing better than the athetoids, these differences could have occurred by chance.

For both the spastics and athetoids some increase in proficiency of vowel and diphthong production was noted among the older age groups. Two-year-old athetoids produced 21 per cent of the vowels correctly and two-year-old spastics used half of them accurately. In general, the scores clustered near the 80 per cent level of accuracy for the five oldest age

TABLE 4. Percentages of correct responses for each consonant in the initial, medial and final position.

Consonants	*Initial*	*Medial*	*Final*
[w]	86.8		
[b]	81.9	72.1	59.0
[j]	80.3		
[m]	78.6	65.5	59.0
[d]	78.6	65.5	54.0
[n]	72.1	68.8	67.2
[h]	72.1		
[g]	70.4	67.2	47.5
[p]	68.8	63.9	63.9
[k]	63.9	57.3	50.8
[t]	62.2	40.9	57.3
[f]	55.7	50.8	54.0
[v]	47.5	45.9	40.9
[tʃ]	39.3	36.0	31.1
[ð]	36.0		
[z]	36.0	26.2	36.0
[dʒ]	36.0	31.1	29.5
[l]	32.7	34.4	31.1
[ʃ]	31.1	29.5	22.9
[s]	26.2	24.5	37.7
[r]	24.5	21.3	29.5
[θ]	14.7	18.0	18.0
[ŋ]		65.5	70.4

groups. Correct diphthong responses for the three youngest age groups of athetoids were less than 75 per cent, and 80 per cent among the three oldest age groups. Diphthongs were produced correctly more than 85 per cent of the time by the five oldest groups of spastics.

Accuracy of Production of Consonants. Correct responses ranged from 14 to 86 per cent for individual consonants. As Table 4 indicates, only five sounds in the initial position were produced accurately by 75 per cent of the total group: [w], [b], [j], [m] and [d]. These consonants appear earliest also in the speech development of normal children. No medial or final consonants were utilized correctly by 75 per cent of the group.

Comparison of this cerebral palsied population and Templin's normal group with regard to accuracy of consonants shows that the former group is seriously retarded (7). The five initial sounds which the cerebral palsied group achieved represent less than one-half of those attained by 75 per cent of the three-year-olds in Templin's study. In addition, 75 per cent of her three-year-old group produced 11 medial and five final consonants correctly. Yet, 93 per cent of these cerebral palsied children were at least three years of age; and more than half were over five years.

Comparison of Consonantal Accuracy of Athetoid and Spastic Groups. Consonant scores for the athetoids and spastics were computed, with each consonant produced correctly being assigned a value of one. The range for the athetoids was zero to 54; and for the spastics, zero to 59. Table 5 shows the medians, means and standard deviations for both groups. The median for the athetoids was 28; for the spastics, 35.5. The mean for the athetoids was 25.8, with a standard deviation of 17.3; and the mean for the spastics was 33.9, with a standard deviation of 16.9.

In order to compare the facility which athetoid and spastic children

TABLE 5. Measures of central tendency and variablility in accuracy of consonants.

Athetoids			*Spastics*			*U*	*p**
Mean	*S.D.*	*Median*	*Mean*	*S.D.*	*Median*		
25.8	17.3	28.0	33.9	16.9	35.5	351.0	.10

* Probability associated with a value as extreme as the observed value of *U*.

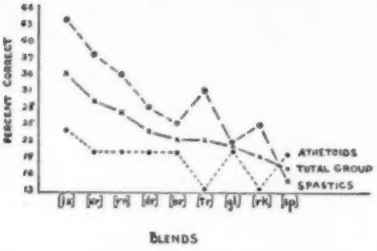


FIGURE 3. Percentages of correct responses for the nine blends.

demonstrated in the use of consonants, each child was ranked on the basis of his consonant scores. The Mann-Whitney *U* test (*6*) was used to determine whether the scores of the athetoids and the spastics had the same central tendency. Since the sample was greater than 20, the *U* was transformed into a *z*-score, and its significance was determined by reference to the normal probability table. Since the probability associated with the *z*-score was not significant at the .05 level or less, it can be assumed that the scores for correct consonantal production of athetoids and spastics had the same central tendency.

Consonantal Sounds Which Reached the 75 Per Cent Level of Proficiency According to Age Groups. Percentages of correct responses for each sound for each age group were computed. The greatest accuracy was found for the sounds in the initial position. The two-year-olds had not reached the 75 per cent level for any sound. The five-year-olds achieved it for only one—the [w]. The four- and six-year-olds were proficient at this level for seven and six sounds respectively. Both groups had the [w], [b], [j] and [g]. The four-year-olds in addition had the [d], [n] and [k]; and the six-year-olds, [m] and [h]. The three- and seven-year-olds had achieved correct production for 11 and 12 sounds, respectively. Both were accurate in the 10 sounds which ranked highest: [w], [b], [j], [m], [d], [n], [h], [g], [p] and [k]. In addition to these sounds, the three-year-olds had the [t]; and the seven-year-olds, the [f] and [v].

Sounds in the medial position showed less accurate production than those in the initial position. The two- and five-year-olds failed to achieve the 75 per cent level for any sound. The six-year-olds had reached this level for only one sound, [m]; the four-year-olds, for [n] and [d]. The three-year-olds had the [b], [n], [g], [m] and [k]. The seven-year-olds were proficient in eight sounds: [b], [n], [g], [d], [ŋ], [p], [k] and [f].

TABLE 6. Median ages expressed in months for appearance of three language items for the cerebral palsied population.

Language Item	*Athetoids*		*Spastics*		*Total Group*		*Chi-square*
	N	*Median*	*N*	*Median*	*N*	*Median*	*Values**
First Words	35	18	33	13	68	15	2.12
Two-word Sentences	31	54	30	30	61	36	2.89
Three-word Sentences	26	N.Y.†	21	60	47	78	2.20

* A chi-square value of 3.84 is necessary for significance at the .05 level.
† Not yet.

TABLE 7. Median ages for appearance of language items for the cerebral palsied population and mean ages reported by McCarthy for a normal population.

Language Items	*Mean Age (months) Normal Children*	*Median Age (months) Cerebral Palsied Children*
First Words	12	15
Two-word Sentences	24	36
Three-word Sentences	30	78

Few sounds in the final position reached the 75 per cent level in any age group. Only the three- and the seven-year-olds achieved this level for any consonants. Both groups were proficient in the use of [n], [ŋ], [p], [b], [t] and [k]. In addition the three-year-old group produced correctly the [m] and [f], and 75 per cent of the seven-year-olds attained the [d].

Accuracy of Production of Consonant Blends. Figure 3 shows the percentages of correct consonant blend responses for the athetoids, spastics and combined groups. The range of total correct responses was 17 to 34 per cent. Approximately one-third of the responses for the [lk] blend and one-sixth of those for the [sp] blend were correct. Scores of the spastics were higher than those of the athetoids for all blends except the [sp]. The differences in number of correct responses for each blend for the athetoids and spastics were evaluated by the chi-square test (*6*), but none of the nine chi-square values are significant at the .05 level or less.

Language Items. Data concerning the age of appearance of first words, two-word sentences and three-word sentences were analyzed for all 74 children. Four of the children had not developed words at the time of the examination. Seventeen children did not use two-word sentences, and 23 children had not yet combined three words in sentences.

Median scores for each language item in Table 6 indicate that the spastics developed words and sentences earlier than the athetoids. The median age at which words appeared among the spastics was 13 months; two-word sentences, 30 months; and three-word sentences, 60 months. For the athetoids, the median age in words was 18 months; for two-word sentences, 54 months; and the median for three-word sentences could not be computed because more than one-half were not yet using them. The following median ages for the combined group were obtained for the language units: 15 months for words, 36 months for two-word sentences, and 78 months for three-word sentences.

The median test was employed to evaluate the hypotheses that the athetoids and spastics were from populations with the same median ages for the appearance of first words, two-word sentences and three-word sentences (*6*). Since the chi-square values are not significant at the .05 level or less, it can be assumed that the athetoids and spastics were drawn from a common population with the same medians for these language items.

Table 7 shows the median ages of appearance of the selected language items for these cerebral palsied children and means for normal children

reported by McCarthy (*4*). Comparisons must be gross since normative data are reported in mean ages, and the data for this population had to be analyzed in terms of medians. To the extent that the median and mean ages are indications of central tendency, it would seem that the cerebral palsied group was three months later than the normal population in appearance of first words, 12 months later in utilization of two-word sentences, and 48 months behind the normals in development of three-word sentences.

Discussion

All of the children in this study demonstrated some means of communication. Some of them had developed only simple gestures. Others utilized vowel and diphthong approximations of words. The majority had some consonants. A few had achieved a speech proficiency which was comparable to that of normal children of the same chronological age.

A combination of several factors may be responsible for the continued use of a gesture language among some of the children. The majority of the children in the gesture language group were young, and they showed severe general physical involvement, severe involvement of the speech muscles, and mental retardation. Although the majority ranked in the lowest educational category used in this study, they were considered educable. Repeated failure to be understood when oral language was attempted and possibly lack of encouragement to talk at home may have been factors contributing to the continuation of the gesture language.

The children who were talking followed the sequence of normal speech development. Although the condition of cerebral palsy affected the age at which sound proficiency and word usage were established, it did not prevent the orderly acquisition of an oral language pattern for most of the children. First words appeared a few months later than those of normal children; two-word sentences were a year later, and three-word sentences were four years later than those of a normal population. Vowels and diphthongs were close to normal. Increase in accuracy of consonantal sounds proceeded from the simplest to the most complex sounds. Consonantal proficiency was highest for the bilabials, followed by the tongue-tip simple, back of tongue, lip complex, and tongue-tip complex sounds. Initial sounds were more accurate than medial sounds, and more medial sounds were accurate than final sounds.

Scores for the articulation test did not show an increase with each of the older age groups. Since the test is a measure of a child's development, it would seem that a gain in proficiency should be noted in each of the older age groups. However, the three-year-olds had scores which approximated the seven-year-olds', and five-year-olds achieved scores which were close to those of the two-year-olds. Several possible explanations should be considered. No three-year-old had been designated as severely involved by the medical consultants, but one-third of the five-year-olds were so classified. The five-year-olds, in addition, demonstrated very low proficiency on tests involving the speech musculature.

These data on oral responses represent the performance of an educable cerebral palsied group. Factors besides intelligence, however, had reduced the adequacy of their speech performance. Skill in articulation did not equal that of normal three-year-old children. Therefore, it might be expected that

a less intelligent group would demonstrate an even lower level of proficiency.

Conclusions

Among the group of young educable cerebral palsied children who were studied, two types of language responses were elicited. At least one child in each age category was dependent upon a system of gestures for communication. The majority, however, were using oral language.

The group to whom the oral language test was administered showed the following characteristics:

1. In speech learning there was a strong similarity between this cerebral palsied population and normal children. Although there was a delay in achievement, this cerebral palsied group developed earliest those sounds and language items which appear first in normal children.

2. Achievement in proficiency of production of groups of sounds followed the developmental schedule. Vowels were produced correctly more than 85 per cent of the time, and about 80 per cent of the time diphthongs were produced correctly. One-half of all consonants and less than one-fourth of the consonant blends were accurate.

3. Consonantal proficiency followed an orderly pattern of development. Bilabials were produced correctly most frequently, followed by the tongue-tip simple, back of tongue, lip complex, and tongue-tip complex sounds. Initial sounds were produced correctly more frequently than the medials, and the medials more often than the final sounds for most consonants.

4. Accuracy in consonantal production was limited. Only five consonants in the initial position were produced correctly by 75 per cent of the entire group.

5. The level of articulation skill of this group appeared to be below that of normal three-year-old children. Yet only four children in the study were under three years of age, and 57 were age three and over. The mean age of the total oral language group was 65 months.

6. Acquisition of three language items was delayed. The median age for the appearance of first words was 15 months; two-word sentences, 36 months; and three-word sentences, 78 months.

7. Differences in scores for tests of speech sound proficiency between the athetoids and spastics were not significant. In all of the sub-tests, however, the spastics had higher percentages or mean scores.

8. Scores on consonants did not increase with each of the older age groups. The two-year-olds had the lowest, and the five-year-olds had the next lowest scores. The three-year-olds attained higher scores than most of the other age groups. Factors other than age alone influenced these test results.

Information gleaned from this study of the speech and language skills of educable athetoid and spastic quadriplegic children can be employed in a speech habilitation program. Activities which involve production of sounds that appear early in the speech of normal children can be stressed. Development of a pertinent vocabulary which utilizes the least complex sounds would make it possible for the child to engage successfully in oral communication and provide encouragement about his progress for him, his parents, and for his speech therapist.

Summary

The language development and articulation skill of 74 young spastic and athetoid quadriplegic children were evaluated. The data indicated that most of the sample used oral language, although at least one child in each age category was dependent upon gestures. Although the children were seriously delayed in the achievement of proficiency in the language and speech items, they developed first those skills which appear earliest in normal children. Although spastics attained higher scores than athetoids on most of the test items, the differences were not statistically significant.

References

1. Denhoff, E., and Holden, R. H., The developmental ladder in cerebral palsy. *Crippled Child*, 29(3), 1951, 4-5, 28.
2. Irwin, O. C., Phonetic equipment of spastic and athetoid children. *J. Speech Hearing Dis.*, 21, 1956, 446-449.
3. Lencione, R. M., A study of the speech sound ability and intelligibility status of a group of educable cerebral palsied children. Ph.D. Dissertation, Northwestern Univ., 1953.
4. McCarthy, D., Language development in children. In L. Carmichael (ed.), *Manual of Child Psychology*. New York: John Wiley and Sons, Inc., 1954.
5. Perlstein, M. A., Infantile cerebral palsy; classification and clinical correlations. *J. Amer. med. Ass.*, 149, 1952, 30-34.
6. Siegel, S., *Nonparametric Statistics for the Behavioral Sciences*. New York: McGraw-Hill, 1956.
7. Templin, M. C., *Certain Language Skills in Children*. Minneapolis, Minnesota: Univ. of Minnesota Press, 1957.

KANSAS STATE UNIVERSITY LIBRARY
AUG 10 1959
MANHATTAN, KANSAS

Communication Skills And Intelligence In Right And Left Hemiplegics

Daniel R. Boone

What is known of the speech and language problems of the hemiplegic is generally confined to our knowledge of aphasia. The language problem of aphasia is usually identified with the right hemiplegic. Little is written about the large population of hemiplegics who have no diagnosed aphasia, but who display variations from their former communication abilities and demonstrate observable changes in intelligence.

Several investigators (*1, 9, 14*) have reported no significant difference in performance on intelligence tests between right and left hemiplegics, although both of these hemiplegic groups had test scores significantly lower than those of the normal population. Marked differences in communication abilities are commonly observed between right and left hemiplegics (*3*). The relationship of intelligence to aphasia is difficult to determine; the problem was well described by Weisenberg (*15*) when he wrote, 'Some investigators have held that intelligence suffers because speech is disturbed while others have held that speech is disturbed because of the intellectual disorder.' A localization approach to the problem would probably argue that the aphasic hemiplegic may have specific language defects, but be relatively unimpaired in his over-all functional intelligence (*10*). The holistic or integrative approach to cerebral function would probably support the viewpoint that aphasia is only a part of an extensive intellectual deficit (*11*). There is little experimental evidence to support either point of view.

The purpose of this study was to examine a randomly selected sample of right and left hemiplegics for variations in such communication skills as listening to speech, naming, clarity of speech, reading, writing and conversational ability. Communication performance was then related statistically to background variables, particularly intelligence, side of hemiplegia, and number of cerebrovascular accidents (CVAs). This study will consider these problems: (1) determination of the similarity or difference in communication skills and intelligence between right and left hemiplegics in this sample; (2) determination of the relationship between performance on communication tests and performance on intelligence measures; (3) determination of the influence of multiple CVAs on performance in communication tests and intelligence measures.

Daniel R. Boone (Ph.D., Western Reserve University, 1958) is Chief of Speech and Hearing Therapy, Highland View Cuyahoga County Hospital, Cleveland, Ohio. This article is based on a portion of the writer's doctoral dissertation, under the direction of Professors R. S. Craig, Chairman, M. Peszczynski, P. Ptacek, E. Schubert and F. Shontz. The paper was presented at the 1958 American Speech and Hearing Association Convention in New York.

Procedure

Subjects. Seventy-five hemiplegic adults were selected randomly from the in-patient population of Highland View Cuyahoga County Hospital, Cleveland, Ohio. Fifty subjects were chosen from the existing hemiplegic population by use of a Table of Random Numbers (*6*). To avoid a bias in selecting subjects with longer histories of hospitalization, the remaining 25 subjects were chosen by successive sampling of new admissions. Thirty-nine females and 36 males were selected, with a mean number of years in school of 8.1 years; 14 subjects attended or graduated from college, and one subject had no formal schooling but had taught himself to read. Each subject was placed in one of four occupation categories: 37 subjects had been non-skilled workers, 11 were former housewives, 16 had held clerical positions, and 11 were former professional workers. By use of a statistical comparison of group means and by correlation techniques, no significant relationship was found between age, sex, education, or former occupation to performance on any of the experimental measures.

Each subject was administered a visual and audiometric examination and was given an evaluation by a neurologist. Data on side of hemiplegia, visual and auditory acuity, number of CVAs, length of time since CVA, and absence or presence of bilateral lesions were then recorded for each subject. Forty subjects were classified as right hemiplegics and 35 subjects were left hemiplegics. Fifty-four subjects were classified as having only one known CVA, with the remaining 21 subjects having two or more CVAs.

Testing. Because a number of hemiplegics have visual field defects (hemianopia) as well as unilateral paralysis, the visual-motor requirements of such tests as the Wechsler Adult Intelligence Scale, Raven Progressive Matrices, and Porteus Mazes often penalize the hemiplegic. Shontz has recommended the Columbia Mental Maturity Scale (*5*) and the Knox Cubes (*2*) (both originally designed for use with children) as 'appropriate instruments for the evaluation of the intellectual capacities of hemiplegic patients' (*14*). Both the Columbia Mental Maturity Scale (CMMS) and the Knox Cubes (KC) require no verbalization from the subject, only gross motor patterns, and relatively gross visual discrimination; for these reasons, both tests were included in this testing battery. The raw scores obtained were used to rank each subject relative to his position with other subjects, with no attempt made to convert raw scores into intelligence quotients or mental ages.

Six communication tests were administered to all subjects in a counterbalanced order of presentation to minimize the collective effects of practice and fatigue. The individual communication tests were adapted and developed from either the existing tests of Schuell (*13*) or Eisenson (7), or developed by the writer in a pilot study. Scoring was limited to counting of errors or to the placement of each subject into one of several nominal groups according to the level of his performance on a particular test. Emphasis in the testing battery was given to the subject's abilities in reauditorization, described by Schuell (*12*) as the 'retention and recall of sound patterns utilized in language.' Defects in reauditorization ability are also commonly called 'auditory verbal agnosia' or an 'auditory receptive aphasia.' The six tests (*4*) used were the following:

1. Reauditorization Test
   a. Purpose: To measure the subject's ability to retain, recognize and recall spoken patterns of language.
   b. Stimuli: One hundred items adapted from the work of Schuell (*13*), each testing for reauditorization ability by one of five methods (recognition of naming of objects, auditory retention span for instructions, auditory retention span for digits, auditory comprehension, and auditory retention and recognition of errors).
   c. Method: Presented generally 40 dbs above subject's pure-tone threshold, by use of live voice through the speech system of the Maico MA-1 Hearing Evaluator with dynamic ear receivers.
   d. Scoring: Number of errors was recorded for each of the five sections of the test, giving profile of individual sections and when cumulated, providing a total score. Repeated instructions were avoided, but when given for supportive reasons, the subject's response was counted as an error.
   e. Time limit: Ten seconds for each item from time of stimulus presentation to time of subject's response.

2. Naming Test
   a. Purpose: To measure the subject's ability to name common animate and inanimate objects.
   b. Stimuli: Twenty black and white drawings were used for picture identification.
   c. Method: Examiner presented 20 stimuli in the same serial order, preceding each stimulus presentation with the question, 'What is this?'
   d. Scoring: Total number of error responses was recorded as the subject's score.
   e. Time limit: Ten seconds for each response.

3. Dysarthria Rating
   a. Purpose: To examine each subject for the presence and severity of dysarthria.
   b. Stimuli: Subject's spontaneous speech was observed, or the patient's responses in the Naming Test were evaluated.
   c. Method: A five-point rating scale on degree of speech involvement was developed independently by two examiners. (Reliability = .90) Scale ranged from normal, slight dysarthria, moderate, severe, and not enough speech to measure.
   d. Scoring: Subject was assigned rating representing degree of subject's speech involvement.
   e. Time limit: None.

4. Reading Test
   a. Purpose: To measure subject's reading comprehension ability for basic reading materials (third grade level).
   b. Stimuli: Ten items adapted from Eisenson's *Examining for Aphasia*, written in India ink on yellow cards in large script (one-half inch).
   c. Method: Subject was asked to point to correct response among four alternate responses listed at the bottom of the card.
   d. Scoring: Total number of errors was recorded as the subject's score.
   e. Time limit: Twenty seconds.

5. Writing Test
   a. Purpose: To test subject's ability to formulate basic written word patterns (not to test for motor difficulties in handwriting).
   b. Stimuli: Subject was provided with lap board (on wheel chair), 8½" x 11" white paper, and soft lead pencil.
   c. Method: Subject was asked to write his name, write four alphabet letters on dictation, spell on dictation, and write a sentence about the weather.
   d. Scoring: Subject's writing samples were judged for correctness, and he was assigned one of six possible ratings, representing performance in written formulation.
   e. Time limit: None.

6. Conversational Rating
   a. Purpose: To test subject's ability to formulate oral sentences in conversation appropriately related to three picture presentations.
   b. Stimuli: Subject was presented three story pictures in succession and asked, 'Tell me what you see in this picture.'
   c. Method: A four-point rating scale on conversational ability was developed independently by two exam-

TABLE 1. Reauditorization Test performance between right and left hemiplegics controlling performance on intelligence measures.

CMMS-KC Score	*Mean Number Of Errors Reauditorization Test*			*F* (*N*=72, *d.f.*=69)	
	Right Hemiplegics	*Left Hemiplegics*	*Row* $\overline{X}$		*p*
Upper ⅓ on CMMS-KC	24.5	10.3	17.9	F = 10.8 rows	>.01
Middle ⅓ on CMMS-KC	37.9	16.0	27.7	F = 30.1 columns	>.01
Lower ⅓ on CMMS-KC	58.4	24.5	42.6	F = 1.8 inter.	<.01
Column $\overline{X}$	40.3	16.9			

iners. (Reliability = .95) Scale ranged from normal, phrases and broken sentences, word naming only and occasional phrases, and no speech or extremely limited responses.

d. Scoring: Subject was assigned rating representing his conversational ability.
e. Time limit: None.

Results

No significant differences were found between right and left hemiplegics on the two measures of intelligence: for the Columbia Mental Maturity Scale (CMMS, $t = 2.13$, and for the Knox Cubes (KC), $t = 2.01$, both accepted at the .01 level of confidence. A correlation of .69 (Pearson) was determined between the CMMS and the KC. Significant differences were found between right and left hemiplegics on the total test performance of the Reauditorization Test, with $t = 8.36$ showing significant differences between the two groups at the .01 level. The Reauditorization Test correlated significantly with performance on the CMMS and KC, with Pearson *r*'s of .60 and .58, respectively. The factor of intelligence was next controlled by grouping reauditorization scores according to side of hemiplegia and intelligence test scores. Subjects were ranked according to their combined rank order position on the CMMS and KC. An analysis of variance statistical treatment was used, placing each subject's reauditorization score into one of six cells, determined by the side of hemiplegia and his rating on the combined rank orders of the CMMS and KC. The means for each cell are shown in Table 1.

Subjects who made lower scores on the combined CMMS and KC generally made lower scores on the Reauditorization Test. However, since only chance interaction was found to exist among the cells, it cannot be said, for example, that right hemiplegics who do poorly in the receptive language tasks involved in reauditorization will necessarily do poorly on intelligence measures. While intelligence was found to be a significant factor in performance in reauditorization, performance by a right or left hemiplegic on the language test could not be predicted by the administration of the CMMS or KC alone.

When the sample was divided into two groups relative to number of CVAs (54 with one CVA, 21 with two CVAs or more), a *t* test demonstrated no significant differences between these two groups in performance on the CMMS and KC: $t = 1.13$

TABLE 2. Differences in communication skills betweeen right and left hemiplegics.

Communication Skill	*Right Hemiplegics N = 40*	*Left Hemiplegics N = 35*	*Statistic*	*p*
Reauditorization	Mean = 48.6 S.D. = 24.4	Mean = 16.8 S.D. = 14.1	$t = 8.63$	>.01
Reading	Mean = 6.7 S.D. = 3.6	Mean = 2.3 S.D. = 3.3	$t = 3.84$ (Dist. normalized by sq. root)	>.01
Naming				
faulty	28	8		
normal	12	27	$\chi^2 = 14.3$ (1 d.f.)	>.01
Dysarthria				
none	6	9		
slight	16	17		
moderate	7	5	$\chi^2 = 5.16$	<.01
severe	7	4	(4 d.f.)	
no speech	4	0		
Writing				
defective writers	32	12		
normals	8	23	$\chi^2 = 14.3$ (1 d.f.)	>.01
Conversation				
normal	8	28		
phrases only	12	7	$\chi^2 = 32.7$	>.01
word naming, no speech	20	0	(2 d.f.)	

on the CMMS and $t = 1.23$ on the KC ($p<.01$). Although preliminary investigation indicated that differences in Reauditorization Test performance might be found between subjects with single and multiple CVAs, no significant differences could be demonstrated between the two groups in the present study, $t = .99$ ($p<.01$).

Significant differences were found between right and left hemiplegics on all communication tests, with the exception of the Dysarthria Rating, as shown in Table 2.

Only the Reauditorization Test and Reading Test yielded normal distributions of scores, permitting the use of the *t* statistic. The other tests, three of which were rating scales, produced nominal groupings, making the chi-square statistic useful as a test for significance of performance differences between right and left hemiplegics. Because of the bimodal distribution of scores on the Naming Test, the sample was grouped into 'normal' and 'one or more error' groups, which, when subdivided into right and left hemiplegic sub-groups, were tested for significance by use of chi-square. The right hemiplegic group made significantly more errors in reauditorization, naming, reading, writing and conversational ability. While no significant difference in degree or severity of dysarthria was found between right and left hemiplegics, it is of interest to note that only 20 per cent of the sample (15 subjects) were considered to have normal speech, free of dysarthria.

Discussion

Performance of basic communication skills after hemiplegia appears directly related to the side of cerebral hemisphere involvement, with right

hemiplegics as a group consistently demonstrating poorer language function. This investigation found that among 75 hemiplegic adults there were no significant differences between right and left hemiplegics in performance on two intelligence measures, the Columbia Mental Maturity Scale (CMMS) and the Knox Cubes (KC). However, in listening to speech, naming, reading, writing and conversation, right hemiplegics gave significantly poorer performances than left hemiplegics.

The finding of similarity on nonverbal intelligence tests and the marked differences in communication ability between the right and left hemiplegic groups has several implications. The argument of cerebral localization may gain some support in that language difficulties (aphasia) may exist independently of any extensive intellectual deficit; for example, the aphasic who cannot formulate expressive language may be no different from the other hemiplegics in selecting the proper response on the CMMS and the KC. Many left hemiplegics, without any diagnosed aphasia, made frequent errors in the Reauditorization Test and other language tests, giving the holistic approach to cerebral function some support; a cerebral lesion regardless of location may cause cerebral dysfunction and a lowering of performance on many intellectual skills, such as receptive or expressive language. While performance on intelligence measures by the left hemiplegic is reported in the literature as inferior to that of the normal population (*1, 14*), this writer did not anticipate the numerous errors in reauditorization exhibited by the left hemiplegic group. In analyzing the total language performance of individual subjects, many left hemiplegics communicated with apparent normal content and fluency until examined for higher-level language functions, *e.g.*, making many errors in listening to and following complicated spoken directions. The subjects with gross receptive and expressive aphasias appeared confined to the right hemiplegic group, with occasional subjects having more difficulty in only one language area, such as reading or writing. The subtle language deviations exhibited by some left hemiplegics appeared more related to a general reduction of higher level cerebral functions, with primarily the difficult, more complex items leading to failure.

No significant differences in performance on either intelligence measures or communication tests were found between the 54 subjects with one known CVA and the 21 subjects with two CVAs or more. While this finding may be peculiar to this particular sample, it may also suggest that the frequently described concept of further deterioration of intelligence and language from subsequent CVAs be given additional experimental scrutiny. From the results of these data, it appears that the initial CVA is the common 'leveler' for most subjects. It was of interest that hemiplegics with multiple CVAs and bilateral cerebral lesions were found in this study to present the speech and language picture typical of their side of major involvement, *i.e.*, right hemiplegics would have aphasia and dysarthria while the left hemiplegic usually demonstrated only dysarthria.

While there are several reports in the literature of the intellectual inferiority of hemiplegics, it appears that further investigation of this problem is needed. Intelligence was tested in this study by using two measures originally designed for use with motor

handicapped children, because no such reliable intelligence measures exist for the motor handicapped, non-speaking adult. However, both the Columbia Mental Maturity Scale and the Knox Cubes appeared to be useful tests in evaluating the intellectual abilities of adult hemiplegics, especially in comparing a subject's performance with that of other hemiplegics. The ease of administration and absence of demand for speech makes these two tests convenient for use with severely involved adult hemiplegics. Further correlation studies between these measures and standardized adult intelligence scales would increase their value as intelligence tests for aphasic patients.

It appeared that many subjects classified as 'normal' in speech and language skills would, on objective reading-writing tests, demonstrate difficulties in these language functions. Perhaps hemiplegics referred to rehabilitation and vocational training programs should be administered a battery of tests, particularly those measuring reading and writing skills, as such defects may exist sub-clinically and independently of more obvious aphasic difficulties. Further investigation is needed on the question of whether specific language disorders, such as alexia and agraphia, can exist independently from an over-all language deficit.

A diagnosis of hemiplegia does not necessarily imply that the hemiplegic will suffer any communication deviations such as aphasia and dysarthria. Much more predictive would be the additional labeling of 'right' or 'left' hemiplegia, and even with such labeling marked variations in communication skills exist within these two hemiplegic sub-groups. It does appear from this study that aphasic disturbances are fairly well confined to the right hemiplegic group, with left hemiplegics generally free from marked receptive-expressive language disorders. An intellectual deficit appeared present in most subjects included in this sample as evidenced by their difficulties performing the Columbia Mental Maturity Scale and the Knox Cubes. Difficulties in communication experienced by many left hemiplegic subjects appeared more related to this over-all intellectual deficit than to what could be labeled as an 'aphasia.'

Summary

This study investigated a randomly selected sample of 40 right and 35 left hemiplegics (mean age 61.9 years) for variations in basic communication skills such as listening to spoken language, naming, clarity of speech, reading, writing and conversational ability. Results were related to such variables as side of hemiplegia, number of cerebrovascular accidents, intelligence and other background data (age, sex, education, occupation). Significant differences were found between right and left hemiplegics in all communication skills with the exception of incidence and severity of dysarthria, which was the same for each group. Right hemiplegics as a group made significantly poorer scores in tests measuring language skills. No significant difference was found between right and left hemiplegics on two measures of intelligence, the Columbia Mental Maturity Scale and the Knox Cubes. While a strong relationship was found between performance on these intelligence measures and communication tests, it was not possible to predict variations in language performance by the administration of intelligence measures alone. The difficulties shown by many left hemiplegics in tests of reauditorization (listening

to spoken language) appeared related to an over-all intellectual deficit and not to receptive aphasia. No significant differences were found in performance on communication or intelligence measures between patients with single or multiple cerebrovascular accidents.

References

1. Andersen, A. L., The effect of laterality localization of focal brain lesions on the Wechsler-Bellevue subtests. *J. clin. Psychol.*, 7, 1951, 149-153.
2. Arthur, M. G., *A Point Scale of Performance Tests, A Manual.* New York: Psychological Corporation, 1947.
3. Bauer, R. W., and Wepman, J. M., Lateralization of cerebral functions. *J. Speech Hearing Dis.*, 20, 1955, 171-177.
4. Boone, D. R., Variations in communication among 75 hemiplegic adults: an experimental study. Ph.D. dissertation, Western Reserve Univ., 1958.
5. Burgemeister, B. B., Blum, L. H., and Lorge, I., *Columbia Mental Maturity Scale Manual.* New York: World Book Co., 1954.
6. Dixon, W. J., and Massey, F. J., *Introduction to Statistical Analysis.* New York: McGraw-Hill Book Co., 1951.
7. Eisenson, J., *Examining for Aphasia (Manual).* New York: Psychological Corporation, 1954.
8. Head, H., *Aphasia and Kindred Disorders of Speech,* Vol. I. New York: Macmillan and Co., 1926.
9. Morrow, R. S., and Mark, J. C., The correlation of intelligence and neurological findings on 22 patients autopsied for brain damage. *J. cons. Psychol.*, 19, 1955, 283-289.
10. Nielsen, J. M., *Agnosia, Apraxia, Aphasia.* New York: Paul B. Hoeber, Inc., 1946.
11. Ross, A. O., Integration as a basic cerebral function. *Psychol. Rep.*, 1, 1955, 179-202.
12. Schuell, H., Diagnosis and prognosis in aphasia. *Arch. Neurol. Psychiat., Chicago,* 74, 1955, 308-315.
13. Schuell, H., *Minnesota Test for Differential Diagnosis of Aphasia.* (res. ed.) Minneapolis: Univ. Minnesota, 1955.
14. Shontz, F. C., Evaluation of intellectual potential in hemiplegic individuals. *J. clin. Psychol.*, 13, 1957, 267-269.
15. Weisenberg, T., and McBride, K. E., *Aphasia: A Clinical and Psychological Study.* New York: Commonwealth Fund, 1935.

KANSAS STATE UNIVERSITY LIBRARY
AUG 10 1959
MANHATTAN, KANSAS

Abbreviated Sweep-Check Procedures For School Hearing Testing

Bruce M. Siegenthaler

Ronald K. Sommers

With the increasing prevalence of school hearing testing programs there is increasing need for efficient methods of testing school children. The Western Electric 4C Test, although easy to administer and score, has fallen into disuse because of recognized shortcomings (*12, 16*). Instead, the individual pure-tone sweep-check commonly is used. However, the individual sweep-check requires audiometrists of considerable competence for valid testing and relatively more testing time per child.

Attempts to improve hearing screening methods for school children have led to pure-tone group tests. Such tests are intended to retain both the advantages of testing over a wide range of individual frequencies and economy of time. The Massachusetts Test (*10*) is an example of a group pure-tone test which has had some acceptance. It has been reported to fail to detect only 2.8 per cent of college students with hearing loss (*3*). Other forms of group pure-tone tests for school children use pulsed tones (*5, 15*) or other pure-tone stimuli (*8, 10, 11*). These group methods are said to give results which warrant their use. However, when three different screening methods (individual pure-tone sweep, W.E. 4C, and group pure-tone) were compared (*18*) on the same group of children, the individual test was the best method for discovering school children with hearing loss (but it took twice as long per child to administer as a group pure-tone test[1]).

Recently Glorig and House (*6, 9*) reported that examination of 5000 audiometric records of industrial workers, office patients of otologists, and others indicated that over 98 per cent of the audiograms showed at least as much hearing loss at 4000 cps as at other frequencies. A proposed screening technique was based on this finding, with the rationale that if a subject failed to hear a 4000 cps tone he could be suspected of a hearing loss, but if he heard a 4000 cps tone at a given db level his hearing at other frequencies was at least as good as at 4000 cps. The advantages of screening at a single frequency such as 4000 cps included less testing time per subject, less costly equipment, smaller and

Bruce M. Siegenthaler (Ph.D., University of Michigan, 1951) is Associate Professor of Clinical Speech, The Pennsylvania State University. Ronald K. Sommers (M.A., Northwestern University, 1953) is Supervisor of Speech and Hearing, Armstrong County, Pennsylvania.

[1]A recent study by R. Sommers of individual pure-tone testing by groups of school nurses, soon to be published in the *Journal of School Health*, shows that reliable screening can be accomplished with less per-pupil time than reported by Yankauer, *et al.*, if more efficient testing procedures are employed.

more compact equipment, and freedom from the masking effects of low frequency environmental noise. When the 4000 cps check was used with 1500 school children, it was reported to be 98.5 per cent as accurate as the full range pure-tone sweep check.

However, it is the present authors' impression that not infrequently audiometric patterns with more hearing loss at the lower frequencies than at 4000 cps are seen among school children. These curves often are associated with enlarged adenoids, otitis media, or occlusion of the external meatus by cerumen or foreign bodies. Grossman and Marcus (7) reported that 13.7 per cent of the children failing school hearing tests had cerumen and 12 per cent had deafness due to allergies. Landis (*13*) reported that in one Pennsylvania city 85 per cent of the children failing school hearing tests had excessive adenoid growth or otitis media, and in another city only 5.5 per cent of the children with losses had deafness not due to external or middle ear pathologies. A study of school children in Copenhagen (*4*) indicated that only 21.7 per cent of those with hearing loss had inner ear deafness. Wilkerson and Doyle (*17*) found that among 151 children with hearing loss 21.2 per cent had rising or trough-shaped audiometric curves and that 15 of 21 children with rising audiometric curves had otitis media or infected tonsils and adenoids. They also found that of 47 children with otitis media or infected tonsils accompanied by hearing loss, only 11 had gradual or marked downward-sloping audiometric curves, or hearing loss only for the frequencies above 2000 cps. In a survey of the hearing of Illinois school children, Curry (*1*) found that girls had greater mean losses at frequencies 250, 500, and 1000 cps than at higher frequencies such as 4000. Boys, however, showed greater mean losses in the higher frequencies.

Medical pathologies of the ear such as those mentioned above often first manifest themselves as mild hearing losses at the middle and lower frequencies. Although such losses may not impair hearing for speech, they are important because medical and surgical therapy often is most effective in preventing permanent hearing loss and alleviating existing loss when the pathology is not advanced and when the hearing loss is not great. Thus, detection of children with small amounts of hearing loss becomes important for a hearing conservation program. To detect such children requires relatively strict standards for failure on a school hearing test; testing at only a single frequency may fail to detect a considerable proportion of children who could receive benefit from medical or surgical therapy.

In order to evaluate the potentialities of an abbreviated sweep-check, namely, screening at only 4000 cps for detection of hearing loss among school children, the present authors analyzed the audiometric test results on three subject groups. All three groups were of school age and were tested using standard pure-tone audiometers and standard audiometric techniques.

Procedure and Analysis

Armstrong County Schools. During the fall of 1957 the supervisor of speech and hearing for the Armstrong County, Pennsylvania, public schools, organized the school nurses into teams of three or four to do hearing screening and follow-up threshold testing under his supervision in the county public schools. A total of 13,649 children in grades one through six and

TABLE 1. Data from three school populations indicating the percentage of 4000 cps threshold failures among children with hearing loss.

Population Tested	*Number of Children with Hearing Loss*		*Number of Children Failing 4000 cps*		*Per Cent of Children with Hearing Loss Failing 4000 cps*	
	Grades 1-6	*Grades 7, 9, 11*	*Grades 1-6*	*Grades 7, 9, 11*	*Grades 1-6*	*Grades 7, 9, 11*
Armstrong County Schools	505	207	274	135	54.3	65.2
Ball Eagle School Area	143	—	88	—	61.5	—
Audiology Clinic	91*	—	85	—	93.4	—

* Includes children from kindergarten to grade 12 inclusive.

4926 children in grades seven, nine and 11 were tested. Each child was given an individual sweep-check in each ear at 20 db for the octave frequencies 250 through 8000 cps. A child failing any one frequency was given a recheck, and if the failure was repeated, an air-conduction threshold audiogram was completed for him. A confirmed hearing loss was indicated by any threshold poorer than 20 db. The incidence of hearing loss was 3.7 per cent among the elementary children and 4.2 per cent among the secondary children. As indicated in Table 1, of the 505 elementary children with hearing loss, 54.3 per cent had losses at 4000 cps, and of the 207 secondary children with hearing loss, 65.2 per cent had losses at 4000 cps. Table 1 suggests that because 54.3 per cent of the elementary children with hearing loss had reductions of acuity at 4000 cps, this percentage of the total number of elementary children with losses would have been detected by a 4000 cps screening test at 20 db, while 45.7 per cent of those with losses would have been undetected, and that only 65.2 per cent of the secondary children with hearing loss would have been detected by a 4000 cps test, while 34.8 per cent of those with losses would have been undetected.

Bald Eagle School Area. During the spring of 1958, 1096 children in grades one through six of the Bald Eagle School Area, Centre County, Pennsylvania, were given hearing tests.[2] Test-

[2] A Scott Model 410-A Sound Level Meter was used to make sound level measurements in two schools, similar to the schools in the Bald Eagle Area, while a hearing testing program was in progress. In one school, a consolidated school enrolling several hundred elementary school children, of one story construction and three years old, individual testing rooms were used in the 'Health Suite.' In the three rooms used for individual screening, 'C' Scale measurements were 52-56 db, 52-54 db, and 48-52 db. 'A' Scale measurements were 34-36 db, under 36 db, and under 36 db. In the room used for threshold testing the 'C' Scale reading was 46 db, and the 'A' Scale reading was under 36 db. In another school, built about 1910 and containing eight classrooms, the testing was done within the classroom while the children were kept quiet. In each of these classrooms the 'C' Scale sound level meter reading was no lower than 48 db and in none of the rooms was it higher than 56 db. In the same rooms the 'A' Scale readings were between 36 and 48 db. In the isolated room used for threshold testing the 'C' Scale reading was 40 to 44 db, and the 'A' Scale was below 36 db.

TABLE 2. Bald Eagle Area grades 1-6 significant hearing losses detected by 4000 cps test only.

Number of Children with Significant Losses		*Number of Children with Significant Losses Failing 4000 cps*		*Per Cent in Each Group Failing 4000 cps*	
*One Ear**	*Better Ear†*	*One Ear**	*Better Ear†*	*One Ear**	*Better Ear†*
58	18	46	16	79.3	88.9

* 500-2000 cps average 20 db or more in at least one ear.
† 500-2000 cps average 20 db or more, using better threshold at each frequency regardless of ear.

ing was done by university students in an audiology practicum course and by the county speech therapists. This was the first time that systematic testing had been performed in this school area. Individual sweep-check tests for frequencies 250 through 4000 cps were given at 15 db. Most of the testing was done in regular classrooms, with the children kept quiet; some of the testing was done in separate unoccupied rooms. A child failing any frequency in either ear was given an individual threshold audiogram by air conduction, usually in a separate quiet room. A confirmed hearing loss was indicated by a threshold poorer than 15 db at any frequency from 250 to 4000 cps inclusive in either ear. Incidence of hearing loss was 13.0 per cent. The audiograms were inspected for hearing loss at 4000 cps. Table 1 shows that of the 143 children with hearing loss, 61.5 per cent had losses at 4000 cps and presumably only they would have been detected had only 4000 cps been tested for screening purposes.

Many of the 143 children in the Bald Eagle Area with reduced acuity had losses limited to only some of the audiometric frequencies tested, and it is possible to consider them as not having significant hearing losses. The audiograms were re-examined for one ear 'significant' hearing loss, defined as a 500-2000 cps average of 20 db or more, in at least one ear. (If both ears met the criterion, the better of the two ears was tabulated.) Of the 58 audiograms of this type, Table 2 shows that 79.3 per cent had hearing loss at 4000 cps. Thus, testing at only 4000 cps apparently would have detected 79.3 per cent of the 58 children with 'significant' hearing loss in at least one ear.

Some of the 143 children with reductions in hearing acuity had hearing losses which, although significant in the sense defined above, were unilateral and therefore not handicapping for the hearing of speech. The audiograms were examined again for children with 'significant' hearing losses in the better ear. That is, an audiogram had to show an average of at least 20 db loss for the frequencies 500-2000 cps using the better threshold at each frequency regardless of the ear having that threshold. Of the 1096 children tested, 18 had audiograms meeting this criterion. As shown in Table 2, 88.9 per cent of those with better ear 'significant' hearing losses had reductions in acuity at 4000 cps, and it is assumed this percentage of those with this type of loss would have been detected by a 4000 cps screening test.

Consecutive Audiology Clinic Cases. The files of the State Audiology Program at The Pennsylvania State Uni-

versity were used to gather data on 100 consecutive children in kindergarten through twelfth grade seen for clinical testing. Their audiograms were observed for frequencies failed and passed. The results are shown in Table 1. Of this group, nine had normal hearing (all thresholds for 250-8000 cps no poorer than 15 db). Among the remaining 91 children, 93.4 per cent failed 4000 cps in at least one ear.

One-Frequency Test Potential

Our present data indicate that among two public school populations (both predominantly rural, one without a previous comprehensive hearing survey or follow-up) the 4000 cps test would not have detected a sizable proportion of the children with hearing losses. Audiograms indicated that among those children with hearing loss 35.5 per cent or more did not demonstrate losses at 4000 cps, and it is assumed they would not have been detected by the single-frequency screening test. This proportion of undetected hearing losses is too large to justify the added convenience and possible saving of time and expense by giving only the 4000 cps check.

Inspection of Tables 1 and 2 indicates, however, that the 4000 cps test would be expected to have different degrees of case-finding ability, depending upon the degree of hearing loss to be detected by the screening test. According to Table 1, in the Bald Eagle Area 61.5 per cent of the children with any degree of hearing loss would have been detected by a 4000 cps test, while according to Table 2, 79.3 per cent of the children with at least one ear reduced to a three-frequency average of 20 db apparently would have been detected by a 4000 cps test, and 88.9 per cent of those with a better ear average reduced to at least 20 db would have been detected by the 4000 cps test. These data demonstrate that the error in detection of hearing loss by a 4000 cps test probably is reduced as the definition of hearing loss is made more liberal. However, the present authors suspect that a 20 db average hearing-loss criterion is too liberal for school hearing testing when the intent is to detect children with medically treatable ear difficulties.

The data in Table 1 on the 100 Audiology Clinic patients indicate that the 4000 cps test probably would have detected over 93 per cent of those with hearing losses. However, these children were seen in the Clinic because a physician, parent, or a school hearing test suggested the possibility of a hearing loss. That is, as a group these children were preselected to be characterized by ear or hearing diffi-

TABLE 3. Percentages of children with hearing loss having reductions of acuity at each frequency tested.

Loss at Frequency	*Armstrong County*		*Bald Eagle Area*
	Grades 1-6	*Grades 7, 9, 11*	*Grades 1-6*
8000	58.9	61.3	(Not Tested)
4000	54.3	64.5	61.5
2000	48.9	42.6	39.4
1000	62.0	42.6	56.2
500	65.2	62.8	54.1
250	66.9	45.7	48.9

culty. If a 4000 cps check were evaluated with such a group, it is seen that the test would be found to be relatively efficient for the detection of hearing loss.

Two-Frequency Test Potential

Because many school children were demonstrated to have hearing loss at frequencies other than 4000 cps, it is reasonable to expect they would be detected by a test utilizing additional frequencies. The audiograms of children with hearing loss in Armstrong County and the Bald Eagle Area were retabulated for per cent of children with hearing loss failing each of the frequencies tested. These percentages are shown in Table 3. For the Table 3 computations each audiogram was tabulated more than once, depending upon how many different frequencies showed acuity poorer than the screening level. For the Armstrong County secondary grades and the Bald Eagle Area the frequency 4000 cps was the single frequency failed by the greatest percentages of children with hearing losses. The lower frequencies also had relatively high percentages of failures. The different percentages of failures at the various frequencies suggest that a combination of frequencies might yield the highest percentage detection of all children with hearing loss.

However, considerably fewer than five or six frequencies would have to accomplish the purpose if the abbreviated sweep-check were to produce an appreciable saving in time. In an ordinary school screening program a considerable part of the time with each child is occupied with moving the child into and out of the testing room, orienting him to the testing situation, placing earphones on his head, and recording test results. An abbreviated sweep-check would not appreciably reduce the time required for these activities. However, a two-frequency check would reduce the time for actual administration of tones to two-fifths of the time required for a five-frequency sweep-check. Even though the total time per child would not be reduced to two-fifths of the former time, a worthwhile reduction in time might be realized.

In order to discover a possible combination of two tones for an abbreviated check, each frequency from 250-4000 cps inclusive was paired with each other frequency, and the percentage of children with audiograms

TABLE 4. Percentages of children with hearing loss having loss at least at one frequency of each pair of frequencies.

Frequency Pairs	*Armstrong County*		*Bald Eagle Area*
	Grades 1-6	*Grades 7, 9, 11*	*Grades 1-6*
4000, 2000	78.3	79.1	67.1
4000, 1000	79.6	80.6	80.3
4000, 500	88.3	93.8	83.9
4000, 250	87.2	90.1	83.9
2000, 1000	61.0	55.8	60.6
2000, 500	71.0	61.2	62.8
2000, 250	72.7	62.3	62.8
1000, 500	66.7	69.0	67.2
1000, 250	73.1	62.0	70.1
500, 250	65.9	62.0	59.1

showing hearing loss for at least one frequency of each pair was computed.[5] The results are indicated in Table 4 for the Armstrong County and the Bald Eagle Area data. Table 4 may be interpreted to indicate the percentages of children with hearing loss who would have been detected had screening at only two frequencies been done. The percentages among Bald Eagle Area children were highest for the frequency combinations 4000 and 500 cps, and for 4000 and 250 cps (both 83.9 per cent). Among Armstrong County children the highest percentages for both the elementary grades and the secondary grades were for the 4000 and 500 cps combination (88.3 per cent and 93.8 per cent, respectively). Apparently these frequency combinations would have detected a greater proportion of the children with hearing loss than would other combinations of two frequencies.

Among the Bald Eagle Area children with hearing losses, a number showed reductions in acuity at only a single frequency in one ear. It may be postulated that these children have such minor deviations from normal that it is probable the threshold obtained was only the result of inattention, noise or random factors other than hearing loss. When these children were eliminated from the group judged to have hearing loss, the percentage of the remainder with losses at either 4000 or 500 cps, and therefore the percentage that could be expected to be detected by a screening test at those frequencies, was 91.2 per cent.

[5]Losses at 8000 cps were not considered for this analysis because of the relative unimportance of this frequency for the hearing of speech, and the rare occurrence of medical problems of the ear causing hearing loss at only this frequency.

Conclusions

Because over a third of the children in the two school populations studied did not have hearing losses at 4000 cps according to threshold audiograms, but had reductions in acuity at other frequencies, the 4000 cps abbreviated sweep-check apparently would not have been adequate for the detection of children with hearing loss in the school systems studied. If the criteria for hearing loss were modified from a single threshold poorer than 15 or 20 db to at least a 20 db average for the frequencies 500-2000 cps, the 4000 cps check would detect an increased proportion of those with loss. (However, we believe a school hearing-testing program should detect children with less severe hearing loss than this if it is to be adequate for hearing conservation.)

The importance of the sampling of subjects used for evaluating an abbreviated hearing check is demonstrated by the relatively high percentage of children among a group seen in an audiology clinic with hearing losses at 4000 cps. It seems apparent that the development and evaluation of a school screening test should use a school population as the basic source of data.

An examination of the audiograms of school children in the present study indicated that about 83 to 94 per cent of those with losses would have been detected if both the frequencies of 4000 and 500 cps had been used for screening. Screening at these two frequencies would produce a higher rate of detection of children with hearing loss than would other combinations of two frequencies.

Despite the relatively higher percentage of cases expected to be found by screening at two frequencies in contrast to screening at one frequency among the school children studied,

even the two-frequency method apparently would have failed to detect as many as about six per cent of those with losses. It may be expected that the percentage of children with loss not detected by a two-frequency check would be reduced if the criterion for failure on the standard screening test were changed either to require hearing reduction at two frequencies or a more severe loss at least at one frequency.[4] Also, it may be expected that if three frequencies rather than one or two frequencies were tested for screening purposes, the proportion of children with hearing loss detected would increase. However, as the number of frequencies tested is increased, one of the major advantages of doing abbreviated sweep testing, namely, saving of time, is rapidly lost.

In order to evaluate fully the use of various criteria for school screening testing, a comprehensive program of screening at low db levels for a wide range of frequencies and of requiring all frequencies to be heard to pass is necessary. The program should include pure-tone audiograms on all children failing the screening test, follow-up otological examination and treatment of those with acuity reductions, and post-treatment audiometric retesting. Such a study would allow an evaluation of the medical significance of mild or minor deviations in acuity and make possible the determination of a screening procedure most likely to detect children with treatable or significant medical pathologies as well as those with hearing losses sufficient to interfere with the hearing of speech.

In summary, the present data do not support the single-frequency test for the detection of hearing loss among school children. A two-frequency hearing test for screening purposes appears to have the potential for a considerably higher rate of detection of hearing loss among school children. However, the present authors suggest that a program of careful screening testing and threshold testing, follow-up otological examinations and treatment, and post-therapy hearing retesting is necessary before it will be possible to develop, on a firm basis, adequate standards for school hearing-testing programs. A program based on such research promises to accomplish the purposes of school hearing testing, namely, detection of children with hearing losses for speech and conservation of hearing acuity.

The authors recognize that the findings of this study are dependent upon the hearing testing procedures and upon the criteria for test failure used. It may be possible, using different test procedures and test failure criteria, to arrive at a different evaluation of abbreviated hearing screening testing. However, the present data are interpreted to indicate that if relatively stringent standards for hearing loss are utilized, the single-frequency hearing test procedure is not adequate.

[4]An informal report from the hearing and speech therapist in a school area not utilized in this paper indicated that when screening was done at 15 db for audiometer frequencies 250 through 4000 cps and when failure to hear two frequencies was taken as failure on the test, the audiograms indicated that all but one of a group of 140 children with loss had reductions of acuity at either 4000 or 500 cps.

Summary

A total of 14,745 public school children were given Pure-Tone Individual Screening Tests by the usual techniques. One hundred consecutive school children seen in an audiology clinic also were tested for pure-tone acuity. Inspection of the audiograms

of the public school children indicated that at least 35.5 per cent did not demonstrate losses at 4000 cps. Among the clinic cases about 93 per cent had hearing losses at 4000 cps. When various pairs of frequencies were examined, the pair of frequencies 4000 and 500 cps would be as efficient or more efficient than other pairs of frequencies for the detection of hearing loss among school children. The two-frequency test proposed apparently would have detected 83 per cent to 94 per cent of the school children with hearing loss. As the criteria for hearing loss were changed, *i.e.*, as a greater degree of hearing loss is required before the loss can be said to be 'significant,' the single-frequency and two-frequency methods would detect a greater proportion of children with hearing loss. The presented data are interpreted to mean that a single-frequency hearing test procedure is not appropriate for school hearing screening testing purposes. Two-frequency screening testing has a greater potential as a screening device, but it too would fail to detect an appreciable proportion of the children with hearing loss.

References

1. Curry, E. T., Are teachers good judges of their pupils' hearing? *Excep. Child.*, 21, 1954, 15-18.
2. DiCarlo, L. M., and Gardner, E. F., A comparative study of the efficiency of three group pure-tone screening tests for public school children. *Excep. Child.*, 24, 1958, 351-359.
3. DiCarlo, L. M., and Gardner, E. F., The efficiency of the Massachusetts pure-tone screening test as adapted for a university testing program. *J. Speech Hearing Dis.*, 18, 1953, 175-182.
4. Falbe-Hansen, J., Hardness of hearing in school children. *Acta otolaryng., Stockh.*, 44, 1954, 157-160.
5. Glorig, A., Screening techniques for the assessment of hearing loss. *Proceedings of the International Course in Paedo-Audiology*, Univ. Groningen, June, 1953, 23-28.
6. Glorig, A., and House, H. P., A new concept in auditory screening. *Arch. Otolaryng., Chicago*, 66, 1957, 228-232.
7. Grossman, A. A., and Marcus, R. E., Otolaryngological experiences in a hearing survey. *J. Speech Hearing Dis.*, 14, 1949, 240-246.
8. Hoeksema, P. E., and Huizing, H. C., A multiple audiometer for group testing and its use in school audiometry. *Acta otolaryng., Stockh.*, 46, 1956, 227-230.
9. House, H. P., and Glorig, A., A new concept of auditory screening. *Laryngoscope*, 67, 1957, 661-668.
10. Johnston, P. W., The Massachusetts hearing test. *J. acous. Soc. Amer.*, 20, 1948, 697-703.
11. Johnston, P. W., An efficient group screening test. *J. Speech Hearing Dis.*, 17, 1952, 8-12.
12. Landis, J. E., Management of hearing testing programs in public schools. *Amer. Acad. Ophthal. Oto-laryng.*, 1951, Instrumental Section, Course no. 448 (reprint).
13. Landis, J. E., A report on the hearing survey in the public schools of Pennsylvania. *Trans. Amer. Acad. Ophthal. Oto-laryng.*, 56, 1952, 73-76.
14. Nielsen, S. F., Group testing of school children by pure-tone audiometry. *J. Speech Hearing Dis.*, 17, 1952, 4-7.
15. Reger, S. N., and Newby, H. A., A group pure-tone hearing test. *J. Speech Hearing Dis.*, 12, 1947, 61-66.
16. West, R., A critique of the rationals of tests of hearing. *J. Speech Dis.*, 5, 1940, 19-24.
17. Wilkerson, W. W., Jr., and Doyle, J. I., Relationship between etiology of hearing loss and resultant audiometric pattern. *Laryngoscope*, 66, 1956, 550-565.
18. Yankauer, A., Geyer, M. L., and Chase, H. C., Comparative evaluation of three screening methods for detection of hearing loss in school children. *Amer. J. pub. Hlth*, 44, 1954, 77-82.

Screening Tests Of Hearing

Douglas Ann Stevens

G. Don Davidson

In recent years, persons in the field of hearing testing and hearing conservation have been greatly interested in obtaining methods and equipment that will more quickly screen large numbers of persons and still be equally as effective as methods now in use. The hearing screening test probably most widely used at present is the individual sweep-check method in which the intensity level is set at 15 db and the person indicates whether he hears or does not hear each of the test frequencies 250, 500, 1000, 2000, 4000 and 8000 cps.

House and Glorig (*1*), in order to validate their observation that a hearing loss at frequencies below 4000 cps never seemed to be greater than that shown at 4000 cps, analyzed three large independent samples of audiograms and tested 1500 school children in the Los Angeles Public Schools. From the results of their study they concluded that the single test frequency of 4000 cps was 99.5 per cent as effective as the sweep-check method.

There are, however, several questions that might arise about this study. It is to be noted that one group used was made up entirely of aircraft workers. Ears that are exposed to industrial noises over a prolonged period of time, or to a sudden extremely loud noise, will generally first show a loss of acuity at 4000 cps. Either or both of these conditions are likely to exist in an aircraft factory. At least two of the groups used in the study were made up entirely of a male population. Evidence exists that it is more common to find a loss at 4000 cps, without an accompanying loss at any of the other frequencies, among males than females. In the group consisting of 1500 school children, 94.4 per cent passed the single-frequency test while 93.9 per cent passed the standard sweep-check method. Their conclusion was that the single-frequency test was therefore 99.5 per cent as accurate as the standard sweep-check method. To the writers, this does not seem to be the correct conclusion. Actually, 92 children with a possible hearing loss were located with the standard sweep-check method and 84 by the single-frequency method. The latter method failed to find eight children out of 92 with a possible hearing loss or was only 91.3 per cent as accurate rather than 99.5 per cent. In other words, there is the possibility that nine children in every 100 with a hearing loss would not be located by the single-frequency method of screening.

One of the writers noted in a class in audiometry that seven out of 100, or 7.0 per cent of the audiograms made on children and adults who would have failed the standard sweep-check method, showed losses at frequencies of 1000 and/or 2000 cps, but had nor-

Douglas Ann Stevens (M.S., Florida State University, 1958) is Speech and Hearing Therapist, Mississippi Hospital-School for Cerebral Palsy. G. Don Davidson (Ph.D., Ohio State University, 1955) is Assistant Professor of Audiology and Speech Pathology, Florida State University.

TABLE 1. Summary of audiograms: failing 4000 cps; passing 4000 cps but failing one or more of the other test frequencies.

Sample Source	*Total Number of Audiograms in Sample*	*Failed 4000 cps*		*Passed 4000; Failed 250, 500, 1000, 2000, 8000 cps**		*Passed 4000; Failed 500, 1000, 2000 cps**		*Passed 4000; Failed 250, 8000 cps**	
		N	%	*N*	%	*N*	%	*N*	%
Florida State University Speech and Hearing Clinic	287	211	73.5	76	26.5	37	12.9	39	13.6
Leon County Public Health Dept.	1497	700	46.8	797	53.2	622	41.5	175	11.7

* Failed at one or more of these frequencies.

mal hearing at 4000 cps. The percentage that had normal hearing at 4000 cps and a loss at one or more of any of the frequencies usually included in the sweep-check method was considerably higher, in the order of 30 per cent.

It was the purpose of this study (1) to investigate further the effectiveness of the single frequency method using 4000 cps as compared to the standard sweep-check method and (2) to determine whether any frequency or frequencies combined with 4000 cps might be as effective as the standard sweep-check method.

Procedure

Two samples of audiograms were used in the study. One was obtained from the Florida State University Speech and Hearing Clinic files, comprising all audiograms on file at the time of the study, excluding retests, and numbering 287. The audiograms were made in a partially sound-treated room by trained clinic staff, using Beltone, Maico and Audivox audiometers. The exact ambient noise level in the test room was not known, but it had been found through experience to be sufficiently low to perform acceptable air- and bone-conduction tests.

The second sample was obtained from the files of Leon County, Florida Public Health Department, comprising all audiograms on file at the time of the study, excluding retests, and numbering 1497. The audiograms were made in the Health Department building, or in one of the 29 public schools represented, by public health nurses trained in audiometric testing, using Maico and Beltone audiometers. The exact ambient noise level in the test rooms was not known and no doubt varied among the 29 schools. It is quite likely that the ambient noise level in the Leon County sample exceeded that for the FSU sample, especially at frequencies below 1000 cps.

Although the exact proportion of conductive to perceptive type losses could not be determined for either sample, due to the relatively high incidence of middle ear problems among school children, one would expect to find considerably more conductive than perceptive type losses in the Leon County sample. On the other hand, the hearing problems usually seen at the FSU clinic are divided more equally between the two types. The inclusion of adult cases is probably a significant factor.

These two variables, a possible dif-

TABLE 2. Summary of audiograms: per cent passing a combination of 4000 cps and another frequency or frequencies but failing one or more of the remaining test frequencies.

Combination of Frequencies Passed	*Per Cent Failing One or More of the Remaining Frequencies (FSU)*			*Per Cent Failing One or More of the Remaining Frequencies (Leon Co.)*		
	All Remaining	*Speech Remaining*	*250, 8000 cps*	*All Remaining*	*Speech Remaining*	*250, 8000 cps*
4000 and 500	17.8	4.2	13.6	17.3	5.6	11.7
4000 and 1000	20.2	6.6	13.6	24.0	12.3	11.7
4000 and 2000	21.2	7.6	13.6	45.8	34.1	11.7
4000, 500 and 1000	16.4	2.8	13.6	12.5	0.8	11.7
4000, 500 and 2000	14.3	0.7	13.6	15.7	4.0	11.7
4000, 1000 and 2000	17.4	3.8	13.6	22.1	10.4	11.7
000, 500, 1000 and 2000	13.6	0.0	13.6	11.7	0.0	11.7

ference in the amount of ambient noise in the test rooms and the proportion of conductive to perceptive type losses, could have definite bearing on the results of the study.

All audiograms used in the study would have shown a failure of at least one frequency in one ear on a standard sweep-check method of screening which tested frequencies 250, 500, 1000, 2000, 4000 and 8000 cps at 15 decibels.

The two audiogram samples were analyzed separately as to whether the subject would have (1) failed the 4000 cps screening test; (2) passed the 4000 cps screening test, but failed the standard sweep-check test at one or more of the frequencies 250, 500, 1000, 2000 and 8000 cps; (3) passed the 4000 cps screening test, but failed the standard sweep-check test at one or more of the speech frequencies 500, 1000 and 2000 cps; or (4) passed the 4000 cps screening test, but failed the standard sweep-check test at one or more of the frequencies 250 and 8000 cps.

The two samples were also analyzed in the foregoing manner only with a modification to (1) passed 4000 and 500 cps; (2) passed 4000 and 1000 cps; (3) passed 4000 and 2000 cps; (4) passed 4000, 500 and 1000 cps; (5) passed 4000, 500 and 2000 cps; (6) passed 4000, 1000 and 2000 cps; and (7) passed 4000, 500, 1000 and 2000 cps.

Any audiogram that was considered because of failure at one of the speech frequencies was not included in the number that failed at one or more of the frequencies 250 and 8000 cps, even though an accompanying loss at one or more of these did sometimes occur. In like manner, any audiogram that showed failure at 8000 cps was not again included when the tabulation for failure at 250 cps was made, even though some audiograms showed a failure in both of these frequencies. The analysis was handled in this manner because it was assumed that a loss in the speech frequencies was the most significant and that a high frequency loss at 8000 cps was more significant than one at 250 cps.

Results

The results of the study are shown in Tables 1 and 2. It can be seen that a hearing screening method using the

single frequency of 4000 cps, or one using 4000 cps combined with any one, two, or three of the other speech frequencies, was not as effective as the standard sweep-check method. By combining 500 cps with 4000 cps, considerably fewer cases with a measured hearing loss would have been missed. Combining 1000 or 2000 cps with 500 and 4000 cps reduced the number missed still further but not to the relative degree that 500 cps had done. Adding still another speech frequency to these did not reduce the number missed to a much greater extent. The latter combination would still have failed to locate a number of very high frequency losses and a few very low frequency ones.

Discussion

In comparing the results of the two samples, it is noted that in using the 4000 cps single-frequency screening method more persons per 100 with a measured hearing loss would have been missed in the Leon County sample than in the FSU sample (Leon Co. 53, FSU 26). Also, the greater proportion of this difference occurs at 500 cps. When 500 cps are combined with 4000 cps in screening, the number of persons per 100 with a measured hearing loss still missed becomes more equal (Leon Co. 17, FSU 18). Two factors might account for this difference at 500 cps: the probable greater amount of ambient noise at 500 cps in the test rooms in the Leon County sample and the greater proportion of conductive to perceptive type losses in that sample.

In comparing the two samples with regard to the best single frequency to combine with 4000 cps in screening, 500 cps are found to be best in both cases. There is some possibility that even in the FSU sample the greatest amount of ambient noise in the test room occurred at 500 cps, enough at times to interfere with accurate pure-tone threshold measurements, at that frequency, but this is doubtful.

The two frequencies considered best to combine with 4000 cps in screening were 500 and 1000 cps in the Leon County sample and 500 and 2000 cps in the FSU sample. The difference might also be attributed to the two before mentioned variables, the relative amount of ambient noise in the test rooms and the ratio of conductive to perceptive type losses.

Summary

This study investigated the effectiveness of a method of hearing screening in which the single frequency of 4000 cps was used, and whether any additional frequency or frequencies combined with 4000 cps might be effective as a rapid, yet accurate, screening tool. Data were obtained through the analysis of 287 audiograms from the Florida State University Speech and Hearing Clinic and of 1497 audiograms from Leon County, Florida Public Health Department.

The results indicate that a hearing screening method using the single frequency of 4000 cps or one using 4000 cps combined with any one, two, or even three of the other speech frequencies is not as effective as the standard sweep-check method.

Reference

1. House, H. P., and Glorig, A., A new concept of auditory screening. *Laryngoscope*, 67, 1957, 661-668.

KANSAS STATE UNIVERSITY LIBRARY AUG 10 1959 MANHATTAN, KANSAS

Counseling Parents Of Stuttering Children

Eric K. Sander

What is the clinician's role in the prevention or early treatment of stuttering? He cannot with clear conscience reassure parents that their stuttering child will 'outgrow' the problem.[1] Or, if in his mind no problem exists (in the child), it will probably not suffice simply to tell parents that they have 'nothing to worry about.'

The task of counseling parents of children thought to be stutterers needs to be outlined more thoroughly than has been done. Schuell (*25*), in a short article, formulated a series of three structured interviews which could be used as a basis for working with parents of stuttering children. Additional thoughts are offered in an article by Brown (*5*) and in the texts of Van Riper (*26*), Johnson (*19*), and Berry and Eisenson (*2*).

When parents cooperate in a counseling program with insight and determination, the outlook for the young stutterer is most favorable. Johnson (*15*) observed 46 stuttering children shortly after the onset of the difficulty. He reports, 'At the close of the study (the median period of observation was two years, four months), speech was judged to have improved in 85 per cent of the cases and to be "normal or nearly normal" in 72 per cent.' Johnson attributes the improvement to be largely the result of parent counseling. In a study of 69 stuttering children, Jameson (*14*) reports that 'normal or near normal speech' was acquired by 20 of 25 children who were referred within one year of the onset of stuttering but by only '44 per cent of those who first attended after more than one year had elapsed.' Continuing, she states that 'normal or near-normal speech was acquired by 82 per cent of the children who attended for advice before five years of age and by 37 per cent of those who began treatment over five years.'

That the adult stutterer faces at best a laborious, imposingly difficult process of recovery emphasizes the necessity for prompt preventive measures. Two distinct reasons for early counseling are stated by Jameson (*14*):

> 1. The speech of a young child with a stammer is not fully stabilized. His hesitations are usually repetitive and seldom accompanied by anxiety; consequently, when environmental pressure on his speech is reduced, he is more likely than an older child to regain normal speech.
>
> 2. The mother of a younger child is,

[1] In 1938 Bryngelson (*6*) hazarded the guess that 40 per cent of stuttering children could be expected to overcome their difficulty without the help of a clinician. More recently, Glasner and Rosenthal (*11*) reported that of a group of 149 first-grade children who at one time were thought by their parents to have 'stuttered,' 81, or over one-half, had stopped stuttering without the benefit of professional assistance.

Eric K. Sander (M.A., University of Iowa, 1959) is a graduate clinical assistant, Cleveland Hearing and Speech Center, Western Reserve University. Grateful acknowledgment is made to Professor Wendell Johnson of the University of Iowa for his assistance with the preparation of this article and most particularly for the use of his file of recorded interviews with parents of stuttering children.

as a rule, willing to accept advice on his management at home. When, however, an older child who has been stammering for some time attends for treatment, not only is his stammering more firmly established, but if the mother has been in the habit of correcting it, she probably finds it difficult to change her attitude.

Examining the Child

In evaluating the fluency of a child's speech, his age should be considered. Davis's early study (*9*) established the general trend (with the exception of syllable repetitions alone) of a decrease in nonfluency with age. Observations by Metraux (*23*) from a study of the language development of 207 preschool children confirm and supplement the findings of Davis. Metraux found a marked decrease in repetitions among children after the age of four. Whereas repetition of words and phrases at 24 and 30 months is a compulsive sort of thing (the repetition may often be broken by introducing a new subject or object), at 42 months repetitions are more likely to be related to other persons and social situations, demands for attention, information or encouragement. After the age of six most children do not differ greatly in fluency from adults.

Johnson (*19*) reports data on the average number of nonfluencies for 42 young stutterers, ages two to eight, matched with 42 nonstutterers. The average child in the stuttering group prolonged or repeated parts of words approximately 10 times more frequently than the average of the nonstuttering group. On the other hand, no significant differences existed between the two groups in the average amount of revision and interjection. The problem of establishing criteria for 'stuttering' *vs* 'normal nonfluency' in a general or basic sense is spelled out in a study by Johnson and his associates (*17*), in which the data referred to here and similar data from 94 additional subjects are reported.

The speech clinician should arrange, if possible, to record the child's speech so that the instances and types of nonfluencies can be closely studied. Careful observation is needed to determine the presence of avoidance reactions distinctly related to the child's speaking efforts: grimaces, hand movements, elbow shrugging, lip compression or preformation, eye blinking, disturbed breathing, *etc.* Such observations are in order not so much to decide whether or not the child *is* a stutterer (the question is ill-phrased) but (*1*) to gain insight into the presence of any circular reactions by the child toward his own speech behavior and (*2*) to secure a clear perception of what the parents may be reacting to in the child's speech.

Brown (*5*) believes that the examiner 'should be as informal as possible' and careful not to exert 'too much pressure' on the child's speech. The beginning clinician is likely to evaluate the child's speech solely by conversing with him in a relaxed atmosphere. A more complete speech examination, however, might take into account the child's reactions to pressure, his performance under stress. By applying the same pressure devices used in desensitization therapy,[2] it may be possible to reproduce, as Berry and Eisenson (*2*) put it, 'in token if not in complete form, the type of behavior

[2]The method of desensitization therapy, as originally outlined in Van Riper's text (*26*), aims to develop in the child a callous resistance to environmental fluency disruptors. The child is subjected to carefully controlled gradations of environmental pressure of the sort that may be precipitating his particular nonfluencies.

in the child's home or school environment to which he reacts unfavorably.'

The child's apprehension or sensitivity to his speech interruptions may determine whether he needs to be included in the therapy program. Much can be learned from the child himself if he is old enough to be interviewed. It might be interesting to ask him, 'Why are you here with your mother?' or 'Why did you come to see me?' The writer recalls one incident in which the child glibly answered, 'Because I stutter. I don't talk right.' The mother, who insisted that the child knew nothing of his difficulty, was openly nonplused.

Counseling Procedure

As with the physician who is able to cure pneumonia while helpless with the common cold, our direct therapeutic methods have been aimed primarily at the older stutterer. It is easy to become absorbed with the dramatic symptomatology of the adult stutterer and blinded to more profitable avenues of early treatment. Only recently has adequate attention been focused upon problems associated with the onset and early treatment of stuttering.

When confronted with a young stutterer,[3] usually it will be necessary for the therapist to deal with the attitudes and behavior of the parents. Those aspects of parental behavior which adversely affect the child and influence his speech must be altered if he is to make a satisfactory adjustment. Lack of collaboration with parents of young stutterers is a shortcoming of many speech therapists. In the school situation, the family may not even be consulted. The young stutterer, however, cannot be disattached and adequately treated apart from his essential relationship with the parents.

A few words of general procedure seem in order before entering into a discussion of the counseling process. To begin with, the therapist must always determine whether the child's speech can rightly be considered disturbed. A careful examination of the child should not only precede the interviews, but is an absolute necessity if we are to guide the direction of the counseling sessions. It would seem both futile and unrealistic, for example, to attempt to convince a parent that her child's nonfluencies are perfectly natural if he is already reacting to his speech, struggling or displaying a habitually excessive degree of tension. If the child's speech is within normal limits, treatment justifiably concerns itself entirely with the parents, their attitudes and speech evaluations.

Brown (*5*) recommends that the examination of the child's speech be done in the presence of the parents and then repeated alone. He continues, 'The behavior of the parents during the child's nonfluencies should be observed, and the child's reactions to their behavior.' The parents may later be asked, 'Is this the sort of thing you're concerned about?' or 'Does he do more of this at home?' Letting parents listen to a recording of their child's speech and asking them to indicate those moments when he is 'stuttering' is often enlightening.

[3]The problem of definition is crucial at this point. According to Johnson (*19*), a child, before being classified as a stutterer, should show unmistakable anxiety-tension reactions in relation to his speech nonfluencies and be definitely regarded as a stutterer by his parents, teachers, or other responsible persons. It is, of course, obvious that if parents regard the child as a stutterer they have a definite need for counseling regardless of the actualities of the child's speech.

Parents are not likely to come to the speech pathologist with any degree of insight. The novice or overanxious therapist must constantly remind himself to 'apply the brakes,' so to speak, never exceeding the parent's capacity for learning or acceptance. When parents are lacking in insight, seeking help but unprepared to acknowledge their role, it will often be desirable to have the child brought to the clinic initially, regardless of his speech, and somehow occupied. In this way, parents, waking to an unpleasant situation, are less likely to break subsequent appointments.

The counseling relationship should be structured. Schuell (*25*) suggests a series of at least four interviews with several follow-up conferences at three- to six-month intervals. More conferences may be necessary depending upon the complexity of the problem.

In some cases parent-education groups may be organized, but the limitations of such an approach should be recognized at the outset. Through intimate contact and awareness of the individual problems of parents, more effective counseling is usually accomplished. Clark and Snyder (7) describe the advantages of an informal group therapy program for parents of pre-adolescent stutterers in which a permissive atmosphere prevails and the therapist does a minimum of interpretation. They report, 'Each parent sees faults and shortcomings in the others, he feels less guilty about his own, and is therefore better able to admit them and cope with them.'

The need for bringing the father into active participation in the counseling program is emphasized by Clark and Snyder. A similar observation is made by Glauber (*12*), who reports that 'when the father did take a consistent and active interest in the stuttering child, the prognosis was invariably more favorable.' Clark and Snyder (7), Glauber (*12*) and Despert (*10*) all paint a dominant mother and passive father picture as the typical accompaniment of stuttering. LaFollete (*22*) in this connection reports that the fathers of older stutterers when compared with a control group on the Allport Ascendance-Submission Test showed greater submissive tendencies. Yet the evidence does not warrant the generalizations of Clark and Snyder to the effect that stutterers lack well-defined masculine identification or that they are somehow the victims of a father-child disturbance.

Evaluating the Parents

Some speech therapists never get beyond the 'don't-label-him-a-stutterer' type of counseling. Often, after a period of calm observation, the nonfluencies subside and are recognized as a passing phase toward maturity. But most frequently the need arises for doing more than imparting *do's* and *don't's* or passing out pamphlets. The case history is an important tool of the counselor for discovering and evaluating the significance of causal and precipitating factors related to the stuttering from which productive insight is gained and beneficial modifications can be made in the home environment.

Parents of stutterers are often critical and almost always overeager about the way their child is speaking. It is difficult to pass off these attitudes as mere products of the end result. Considerable information regarding the parents, the child and the home situation needs to be obtained. It is assumed that the reader enters this discussion with some information on the essentials and techniques of effective interviewing. Johnson, Darley and Spriestersbach (*20*) offer some

particularly valuable suggestions for case history interviewing of parents of stuttering children.

Simply telling the parents early in the counseling program how stuttering often develops is not nearly as effective as having them trace back, if possible, the onset and development of the problem in their own child. They should be given an opportunity to re-evaluate their thinking in concrete vivid terms related to the child's own history. When did they first focus attention on the child's speech? Just exactly what happened in the *beginning*? Under what conditions? How did it sound? Can the parents imitate it?

With older children the memories of parents are usually hazy. It may not pay to unearth the beginnings, to stir up unstirred guilt feelings. If the parents have not delayed in coming for advice, however, it is often possible to pinpoint the date of their first concern by associating other events with the onset. What parents observe in the beginning are usually simple, relatively effortless repetitions (*8*). They may insist that these repetitions are something the child had never done before, yet most probably he did (*4*). To be correct, then, the initial parental judgment of stuttering is probably coincident with the first attentive observations by the parent of the child's early nonfluencies. We might ask: Why were the parents so attentive? Did they have any reason to be concerned about the child? Was he ill? Did he have an accident? Are the parents inclined to worry generally about their children? Is there stuttering in the family background?

Whatever it was that the child did in the beginning, what did the parents do about it? How did they react to it? Darley (*8*) found that in 48 of 50 families, suggestions calculated to help the child 'overcome his stuttering' were made by one parent or both. The accounts of how parents react, their ways of thinking, are often interesting. They may have the vague notion that what they first noticed and called stuttering continued to occur, that the child constantly 'stuttered' from that point on.

What do parents believe is causing their child to stutter? In many cases this will not tell us a great deal about the child, but it will help us to evaluate and understand the parents and the way they have approached their child's problem. Parents are likely to externalize their problems, project their own anxieties to the child. Darley (*8*) reports, 'Only 16 of 100 parents attached importance to the parental role (not necessarily their own) in the development of the child's stuttering, and not even all of those 16 parents considered that role to be necessarily the primary causal factor.'

So blinded may parents be by a tenacious belief that their child's speech is somehow disordered that they are often unable even to describe what it is he is doing. Their expressed feelings are but verbal blindfolds; they tell us little about the child. 'He stutters.' 'He has difficulty.' 'He starts with the first word wrong.' 'He has good days and bad days.' It is generally a nondescriptive, evaluative language that parents use. They seem to have a particular need to become conscious of the distinction between 'fact' and inference, between description and evaluation.

An understanding of the parents would be incomplete without some idea of their standards of fluency. Bloodstein, Jaeger and Tureen (*3*) report that parents of young stutterers are more inclined to react to non-

fluencies as stuttering than are parents of nonstutterers. What concepts do the parents have of normal speech? How do they want Johnnie to talk? How would Johnnie have to be talking before the parents could consider his speech as normal? Such information is not for the counselor's benefit alone; the point cannot be overstressed that these parents need to discover themselves, become aware of their excessively high standards of fluency, and revise them accordingly.

Counseling Program

By now we have given up the search for an unidimensional answer to that all too familiar question, 'What causes stuttering?' We need not fret over subtle dilemmas which have little practical consequence. Whether the child is, as Van Riper (*26*) suggests, being driven to 'the acquisition of adult forms of speech at too early an age,' or, as Johnson (*19*) expresses it, influenced by parents who 'have persuaded themselves that the child's speech is disordered,' is not of life or death importance. In either instance, parents must recognize the essential normality of early nonfluent speech, stop direct attempts at correction, eliminate or reduce apparent fluency disruptors, and give the child a position of love and security in the home. Even the psychoanalysts (*12*) share some common ground as far as treatment is concerned when they attribute stuttering to the maternal relationship and recognize that parents themselves must undergo treatment.

The general objectives of the counseling program thus seem clear. Following the framework suggested by Johnson (*19*), we might reduce our purposes to two basic aims:

1. Parents should be supplied with the information they need in order to appreciate the nature of normal childhood speech. They are helped by knowing the essential facts about normal speech development, especially as far as fluency is concerned. They are helped, too, by knowing about the more important conditions under which children—and adults for that matter—are more and less fluent in speech.

2. Parents should be led, so far as possible, to recognize their own insecurities, their excessive psychological need to have their child speak extremely well and perhaps to excel in other ways too, and, in general, their specific discontents and the reasons for them.

The order in which these two goals have been presented is important. An effective approach involves a *positive* stress, a realistic appraisal of the child's assets. Feelings and behavior deeply rooted in past beliefs are not easily modified. An accusing finger should never be pointed at the past mistakes of parents. It is far better to change the attitudes of parents through a consideration of what Johnnie is doing right, not what they have done wrong. 'They need to be encouraged to accept their child as he is, and to rejoice in his growth and the possibilities of his future,' as Johnson (*16*) has put it.

In order to appreciate fully the part they play in the development or prevention of stuttering, parents must first recognize the essential normality of early speech hesitations. A two-fold problem exists: (1) What sort of information should parents be given? (2) How should this information be presented? Much information relating to stuttering and nonfluent speech behavior is available in texts and research articles (*4,9,17,18,19,23*). Most parents are in want of such information and can usually benefit from it, provided the therapist is sufficiently sensitive to their needs and feelings and has established a warm and open

relationship with them. The ingenious therapist must present the necessary information in such a manner that it will be accepted and acted upon by parents.

Nearly two decades ago Carl Rogers (*24*) wrote a few wise words on the limitations of a strict educational approach in dealing with the feelings or emotions of parents:

> To the beginner in clinical work, education of the parent would seem the answer to a great many of the problems which children present . . . . There would seem to be only one real risk to be considered in the use of such techniques. If a parent is given information which runs strongly counter to his own emotionally determined attitudes he will not only reject the information but may reject the worker as well. To this extent a direct educational approach may block further therapeutic effort, and this must be borne in mind in deciding upon treatment.

The futility of imparting on an intellectual level advice which the parents are not emotionally prepared to accept must be recognized. At no time should the parents be cornered or made to feel guilty because of something they have done. Unless diplomacy is used, the parent, once put on the defensive, will immediately be alienated. As Kanner (*21*) says, a mother 'may be thrown into a state of guilty anxiety without comprehending the basic origin of her panic. Nothing is gained even if she expresses verbal agreement. True and helpful insight can come only from within.' Our task is to get the parents implicated but not deeply disturbed, informed but not guilt-ridden.

The interview following the case history is usually devoted to a discussion outlining the development of speech, the normality of repetitions and perhaps a few beginning words concerning our present knowledge of how stuttering develops. Some questions might first be addressed to the parents. 'How many times do you think the average child at the age of two or three repeats (every hundred or every thousand words)?' 'Do you think normal children repeat at all?' After the therapist has secured an idea of what the parents think, they should be told basic information about early speech development. The following transcript, from an interview by Wendell Johnson, may be suggestive:

> There's been a lot of research done on your children and the way they talk and how speech develops. In children between the ages of two and five years, they *all* repeat. Repetition, in fact, begins with the birth cry. The birth cry is repeated over and over again. It has to be. During the first year, depending upon how you define a repetition and allowing for variations, it's pretty accurate to say that about half of all the infant's vocalizations are repetitions. A child doesn't say 'da.' He says 'da-da-da-da.' This is normal. This is utterly normal. This is essential. Without this you would have abnormality.
>
> Now there is no given Tuesday when the child stops it. He does this all his life. Between the ages of two and five years when children are learning to talk in words and sentences they all repeat—sounds, words, phrases. The average child at that age repeats a *s-s-sound* like that or or words like that *or-two or-two or-two* or more words like that. He does this—up to 100 times per 1000 words is within the norm, a little over 100. They all do it. The mean is from 35 to 50 depending on the type of testing situation. Now that's quite a bit, you see.

Berry and Eisenson (*2*) use a somewhat different approach:

> We ask parents to think about and tell us in what activities aside from speaking the child is likely to be repetitious. Parents, through such a procedure, are likely to become consciously impressed that their child, in common with most normal children, can beat a drum *ad nauseam*, can ride a tricycle *around and around and around*, can listen to the

same records *over and over and over* again, and can enjoy listening to the same story told or read to them without alteration of word or syllable, time after time and day after day. Parents must be helped to realize the normality of repetition—that its presence in speech is not in and of itself to be evaluated as an abnormal phenomenon.

Often a mother will be found who hesitates a good deal more while speaking than does her child. In such cases, assuming the mother considers herself a nonstutterer, it may be particularly helpful, as Berry and Eisenson (*2*) phrase it, 'to have them turn a mirror and reflect on their own speech.'

Home Situation

Too much hurrying, stimulation and excitement is disrupting for the child and should be avoided whenever possible. Parents should eliminate family quarrels and conflicts in the presence of the child which contribute to an emotionally charged home environment; they need not, however, and should not, shelter the child in an overprotective fashion from all 'undesirable' influences. Gottlober (*13*) gives this exposition of how overprotection may follow the diagnosis of stuttering:

> It is quite common to have a parent report that the patient's blocking becomes more frequent when he suffers a disappointment or is punished. When things go smoothly days pass without a sign of hesitancy. The cause and effect become obvious and gradually the entire family is cudgeled into doing the little despot's bidding. No one wants to be responsible for making him 'stutter.'
>
> If an effort is made to understand and treat a child properly from the beginning, this type of behavior need never develop. By bending over backward later and giving him many times the original attention and sympathy he should have got originally, he is only being encouraged in his maladjustment.

Everyone enjoys being listened to. Parents can help a young stutterer by displaying an interest in his message rather than by registering pity for his difficulty. Speech situations will be less frustrating for the child if parents will refrain from interrupting him before he finishes his thoughts. Of course, if the child, lacking words, finds himself groping for a noun, parents may aid him in building a vocabulary.

Counseling implies more than prohibitions. It is necessary to bring about certain positive, constructive changes in the child's environment. Parents should plan to spend more time together with their child. Schuell (*25*) suggests some activities that might be initiated during the counseling program.

Beasley (*1*) comments:

> While one or the other parent may be with the children almost constantly, the time spent together more frequently involves a doing *for* them rather than a doing *with* them. . . . Often parents can see their way clear to working with the child on a task a teacher may have suggested, or they may spend long hours transporting the child for weekly lessons to a distant center, but they fail to realize the value of a similar amount of time spent with the child for enjoyment and relaxation.

By attracting the child's interest in some useful activity within his realm of achievement, parents can help him experience emotionally satisfying accomplishments. Success breeds self-confidence. Everything should be done at home to give the child successful speaking experiences. The talking he does should be both enjoyable and rewarding. In those situations when the child speaks with relative ease he should be encouraged to talk; when he appears to be unusually nonfluent, it is best not to stimulate him further, although he should never be discouraged.

The constructive aid of parents should be enlisted to discover conditions which exist in the home. Van Riper (*26*) has set forth a list of six everyday situations conducive to nonfluency. It might be useful to mimeograph information of this sort to aid parents in carrying out situational analysis assignments. An effective assignment consists of having parents observe for a week the situations in which their child appears overly hestitant; also, those situations in which he speaks quite fluently. These assignments serve a twofold function: (1) Probably most important, they help parents to separate fact from inference through careful observation. Parents, like all human beings, tend to respond to their own anxiety states. In a sense they are too observant; in another sense, not careful enough in their observations. (2) These assignments aid in the elimination of environmental pressures which disrupt the fluency of the child's speech. By recording these circumstances in detail, detrimental influences can be established and eliminated. Parents will do things differently as they come to recognize and correct their past mistakes.

Caution must always be exercised before upsetting the family situation. The fundamental task is to alter the parental conviction that a child is grossly peculiar if he displays some speech hesitations. The therapist cannot hope to eliminate all of the child's nonfluencies. But the parents can learn to reduce their criterion of what is normal.

Brown (*5*) suggests that parents cultivate an objective attitude by observing the repetitions in the speech of normal children outside the family. It might be wise to have them actually tabulate the number of interruptions in their child's speech and in the speech of other children. Perhaps the therapist might arrange a visit with the parents to a preschool nursery. To have the concerned parents of a hesitant, yet normal speaking child observe a severe stutterer with pronounced anxiety-tension reactions would further impress upon them how stuttering in the apprehensive adult differs from the simple and relatively unconscious repetitions of all children.

Telling parents to avoid showing concern for the child's speech is not enough. As Johnson (*19*) says, 'They must not be concerned.' And this requires a basic re-evaluation of their attitudes. Quite often parents will insist that they have done nothing to show their concern for the child. But a beginning swimming student, concerned lest he drown, is not likely to float; so too, an anxious mother, deeply disturbed by her child's speech, will find it difficult, if not impossible, to keep a poker face. It should be explained to parents how their evaluations have a self-reflexive effect both upon themselves and upon the child.

It is a good idea to avail parents of literature on stuttering and general semantics to the extent that they can grasp and comprehend the information. Literature, well chosen, is a great help to the intelligent parent and will make subsequent interviews more meaningful by providing an effective basis for communication. Books and pamphlets should not be given out indiscriminately, however, without a consideration of aims and a prior review of their content with the parents.

Summary

Some suggestions, based in large part upon the research and counseling interviews of Professor Wendell John-

son, were outlined for counseling parents of children thought to be stutterers. Central to this discussion has been the suggestion that parents learn to describe the behavior of their children, particularly with respect to speech, apart from their own evaluative reactions. The speech clinician must impart to parents essential information on stuttering and early speech development. In order to make speech a pleasant and rewarding activity for the child, undesirable influences in the environment must be modified and positive changes introduced.

References

1. Beasley, J., *Slow to Talk*. New York: Teachers College, Columbia Univ., 1956.
2. Berry, M. F., and Eisenson, J., *Speech Disorders: Principles and Practices of Therapy*. New York: Appleton-Century-Crofts, 1956.
3. Bloodstein, O., Jaeger, W., and Tureen, J., A study of the diagnosis of stuttering by parents of stutterers and nonstutterers. *J. Speech Hearing Dis.*, 17, 1952, 308-315.
4. Branscom, M., Hughes, J., and Oxtoby, E., Studies of nonfluency in the speech of preschool children. In W. Johnson (ed.), *Stuttering in Children and Adults*. Minneapolis: Univ. Minnesota Press, 1955.
5. Brown, S. F., Advising parents of early stutterers. *Pediatrics*, 1949, 170-175.
6. Bryngelson, B., Prognosis of stuttering. *J. Speech Dis.*, 3, 1938, 121-123.
7. Clark, R. M., and Snyder, M., Group therapy for parents of pre-adolescent stutterers. *Group Psychol.*, 8, 1955, 226-232.
8. Darley, F. L., The relationship of parental attitudes and adjustments to the development of stuttering. In W. Johnson (ed.), *Stuttering in Children and Adults*. Minneapolis: Univ. Minnesota press, 1955.
9. Davis, D. M., The relation of repetitions in the speech of young children to certain measures of language maturity and situational factors. *J. Speech Hearing Dis.*, 4, 1939, 303-318; 5, 1940, 235-246.
10. Despert, J. L., Psychosomatic study of 50 stuttering children. *Amer. J. Orthopsychiat.*, 16, 1946, 100-113.
11. Glasner, P. J., and Rosenthal, D., Parental diagnosis of stuttering in young children. *J. Speech Hearing Dis.*, 22, 1957, 288-295.
12. Glauber, I. P., Dynamic therapy for the stutterer. In G. Bychowski and J. L. Despert (eds.), *Specialized Techniques in Psychotherapy*. New York: Basic Books, 1952.
13. Gottlober, A. B., *Understanding Stuttering*. New York: Grune and Stratton, 1953.
14. Jameson, A. M., Stammering in children—some factors in the prognosis. *Speech*, 19, 1955, 60-68.
15. Johnson, W., A study of the onset and development of stuttering. In W. Johnson (ed.), *Stuttering in Children and Adults*. Minneapolis: Univ. Minnesota Press, 1955.
16. Johnson, W. (as told to Jerome Ellison), I was a despairing stutterer. *Sat. Eve. Post*, January 5, 1957, 26-27, 72, 74.
17. Johnson, W., *et al.*, *The Onset of Stuttering*. Minneapolis: Univ. Minnesota Press, 1959.
18. Johnson, W., *Toward Understanding Stuttering*. Chicago: National Society for Crippled Children and Adults, 1959.
19. Johnson, W., Brown, S. F., Curtis, J. F., Edney, C. W., and Keaster, J., *Speech Handicapped School Children* (2nd ed.). New York: Harper and Brothers, 1956.
20. Johnson, W., Darley, F. L., and Spriestersbach, D. C., *Diagnostic Manual in Speech Correction*. New York: Harper and Brothers, 1952.
21. Kanner, L., *Child Psychiatry*. Springfield: Charles C. Thomas, 1948.
22. LaFollette, A. C., Parental environment of stuttering children. *J. Speech Hearing Dis.*, 21, 1956, 202-207.
23. Metraux, R. W., Speech profiles of the preschool child 18 to 54 months, *J. Speech Hearing Dis.*, 15, 1950, 37-53.
24. Rogers, C. R., *The Clinical Treatment of the Problem Child*. Boston: Houghton-Mifflin Co., 1939.
25. Schuell, H., Working with parents of stuttering children. *J. Speech Hearing Dis.*, 14, 1949, 251-254.
26. Van Riper, C., *Speech Correction: Principles and Methods* (3rd ed.). New York: Prentice-Hall, 1954.

Double-Syllable Words

C. S. Bluemel

Al Jolson used to say of Walla Walla that the inhabitants liked their town so much they named it twice. This is a clever quip, which we will dismiss after noting that Walla Walla is an Indian name meaning Rushing Water and that the town was originally named Steptoeville.

What really concerns us is simple double-syllable words, such as *mama* and *papa*. Observing that the use of such words appears to be world-wide, we are led to speculate on their origin and significance. What we offer in conclusion is conjecture rather than profound scientific research; nevertheless, the observations may be of interest.

Double-syllable words fall naturally into juvenile vocabulary. In addition to *mama, papa* and *dada,* we have such words as *moo-moo, wow-wow, quack-quack, baa-baa, tick-tick* and *choo-choo.* We infer that children learn these words from their parents; otherwise, why would the American child use the word *choo-choo* for 'train,' while the English child accepts the word *puff-puff?* Hence, whatever the origin of these words, it seems that adults eventually sponsor them.

But the influence of the child must not be overlooked. Tylor (*3*) says in this connection:

> These words are made up all over the world from a few simple syllables which children first utter, chosen almost anyhow to express the nursery ideas of mother, father, nurse, toy, sleep, *etc.* Thus while we have our way of using *papa* and *mama,* the Chileans say *papa* for *mother,* and the Georgians *mama* for 'father,' while in various languages *dada* may mean 'father,' 'cousin,' 'nurse;' *tata* 'father,' 'son,' 'good-bye'! Such children's words often find their way into the language of grown people, and any slight change makes them look like ordinary words. Thus in English one might hardly suspect *pope* and *abbot* of having their origin in baby words, yet this is evident when they are traced back to Latin *papa* and Syriac *abba,* both meaning 'father.'

Apart from the ultimate word-form, it seems that children supply the original rhythm. As we listen, in family life, to a baby's vocal play, we can identify such sounds as *hi-hi, hah-hah, ow-ow, etc.*—all of these sounds being mixed with amorphous baby jargon. Later, having acquired a fragment of maturity, the child invents such words as *guck-guck* for 'duck' and *pull-pull* for an electric light with a pull-chain. Still later, in playing with his train, the child introduces such speech as *ding-dong, choo-choo; ding-dong, choo-choo.*[1] The language is English, but the rhythm belongs to universal speech.

Looking at other European languages, we see that the words *mama* and *papa* are in pretty general use. The words are current in Germany, Russia, Sweden, Norway, Denmark, Hungary, Holland, Spain, Portugal

C. S. Bluemel (M.D., University of Colorado, 1916) is a retired psychiatrist residing at Englewood, Colorado. He was formerly Medical Superintendent of Mount Airy Sanitarium, Denver.

[1] These words are taken from baby diaries in the author's family.

and Italy. In some of these countries the words are spelled *mamma* and *pappa,* and the emphasis may be on the second syllable rather than the first. These, however, are adult refinements, and the child is unaware of them. In France and Belgium the word *mama* becomes *maman.* Italians use the word *babbo* as well as *papa.* The word is clearly related to the term *baba,* as used in Egypt and Bengal, and to the Hindi word *babu,* for father. Despite these minor variations, the rhythm of the double syllables remains.

The words *mama* and *papa* are used in Indonesia. This may be due to Dutch influence, but the Indonesians have double-syllable words of their own—*waw-waw* for dog, *nak-nak* for doll, *lo-lo* for candy, and *did-did* for car.[2]

The Japanese have an extensive vocabulary of double-syllable words. *Haha* is mother; *chichi* is father; *meme* is eye; *mimi* is ear. *Mama* means food; *poppo* means choo-choo; *shishi* means lion. There are many other rhythmic words in Japanese, such as *koro-koro, horo-horo, bata-bata, suru-suru* and *kochi-kochi,* meaning, respectively, rolling, falling, banging, slippery and hard.[3]

There is no need to carry the study of languages further in connection with the thesis we wish to present. The rhythmic repetitive pattern of infant speech seems to be common throughout the world. It is natural, then, to inquire, what is the origin of this rhythmic speech? There is no conclusive answer, but there is interesting speculation, as already mentioned. This primitive rhythm of speech follows the pattern of the heartbeat, and it is probable that the unborn child feels and hears the maternal heartbeat during the latter half of his life *in utero* and that he later patterns his infantile speech accordingly.

The child lies in a sack of fluid—the *waters* that precede his arrival into the world. Water is an excellent conductor, a better conductor than air, and it can be presumed that the fluid carries the *lub-dub* impulse of the mother's heartbeat to the child. (The *lub-dub* sound can be reproduced by folding a large pocket handkerchief till it is four or five inches wide; two quick pulls on the handkerchief then give the *lub-dub* sound which is roughly comparable to the adult heartbeat as heard through the stethoscope.)

To support our theory of prenatal conditioning we would need evidence of consciousness in the life of the unborn child. This can be found in the *quickening,* or movement, which begins in the fourth or fifth month of pregnancy and continues intermittently till the time of birth. This is a motor reaction, and while it is not in itself an evidence of consciousness, it seems to occur at times in response to the stimulus of loud noises—though doubtless to other stimuli as well. There is some evidence of awareness in the very early life of the fetus, perhaps in the third month of pregnancy. Minkowski (*1*) experimented with early fetuses removed surgically with the uterus and found that the fetus responds to stimulation of the skin in different areas. He concludes that the nervous system of the fetus is capable of receiving stimuli, though the conduction is more or less diffuse, and the reaction is generalized and variable. The same observation could be made of the newborn child, but in

[2]Information by Adimir Adin, Denver University.

[3]Information by Dr. Tsuneo Taguchi, Home for Crippled Children, Tokyo.

good logic one would have to admit the stimulus as well as the response.

With respect to the unborn child, the objection might be made that the fetus does not hear *in utero* because the external ear is closed and there is as yet no air in the middle ear. Yet the experience of hearing in a liquid medium is different from hearing in air. A skin diver under water can hear a motorboat too far off to be heard through the air. The fluid sack in the maternal womb may give the fetus a comparable advantage. Moreover, the fetus may hear by bone conduction rather than air conduction. In our speculations we can say that the unborn child probably hears and feels the maternal heartbeat for a period of four or five months before he comes into the world. If this is correct, he is born with a preparatory 'set' in his receptiveness to the rhythm which has been his chief stimulus during his intrauterine existence.

We can identify the *lub-dub* pattern in speech very clearly. It occurs not only in double syllables, but in words modified in the same rhythm—in such words as *mummy* and *daddy*, for instance. Then there are rhythmic words in the child's vocabulary such as *horsie, doggie, pussy, kittie, mousie, piggie, birdie, chickie, etc.* Christian names tend to assume the *lub-dub* pattern, especially when they express endearment. Thus we encounter such names as *Bobby, Billy, Tommy, Jimmy, Freddie, Eddie, Teddy, Jackie, Sammy, Andy, Monty*. It is a long jump from *Montgomery* to *Monty*, but here we see a reversion to the infantile pattern.

We have little more to say about the *lub-dub* principle. As mentioned at the outset, we are offering speculation rather than an *arbeit* or an adventure in research. Indeed, it is doubtful whether the question would lend itself to research. But at least we may ask: If the repetitive rhythm of infantile speech does not come from the *lub-dub* of the maternal heartbeat, where *does* it come from?

Rhythm has been offered as a remedy for stammering. Early in the last century, Thelwell advocated the 'rhythmus of Milton,' while Colombat de L'Isère sponsored the 'metrical regulation of syllables.' Rhythmic speaking and syllabic speaking have constituted whole 'systems' of therapy for stammering; and the metronome, under various names, has been part of the armamentarium of the commercial 'speech specialist.' Actually, rhythm does diminish stammering; but unfortunately there is no release from the artificial rhythm of therapy to normal speech.

Yet rhythm has its special field. 'By nature children live rhythmically and respond to rhythm instinctively' (2). Adults also respond instinctively to rhythm. The slogan, '*Tippecanoe and Tyler too*,' was an elemental yet effective force in the Presidential campaign in 1840. Four years later there was another campaign slogan in the pattern of rhythm—'*Fifty-four forty or fight*.' Rhythm has its place in history. It is persuasive not only in words but also in martial music, and it may influence the outcome of battle. *Lub-dub* is indeed elemental, but it speaks the language of biology, and it is persuasive because it can be felt without being understood.

References

1. Minkowski, M., Reflexes et mouvements de la tète, du tronc et des extrémités du foetus humain pendant la première moitie de la grossesse. *C. R. Soc. Biol.*, 83, 1920, 1202.
2. Sehon, E. L., and O'Brien, E. L., *Rhythms in Elementary Education. New* York: A. S. Barnes Company, 1951.
3. Tylor, E. B., *Anthropology*. New York: D. Appleton and Company, 1909.

KANSAS STATE UNIVERSITY LIBRARY
AUG 10 1959
MANHATTAN, KANSAS

Creative Dramatics In Speech Correction

Barbara M. McIntyre

Betty Jane McWilliams

Creative dramatics is an informal art which encourages freedom of expression in children. Siks (*6*) recently defined creative dramatics as 'a group experience in which every child is guided to express himself as he works and plays with others for the joy of creating improvised drama.' In creative dramatics all dialogue is extemporaneous as the children create their own characters and action. No scripts or technical aids are needed; but, guided by an understanding and imaginative leader, the children plan, play and evaluate the story or situation they are creating together. The basic requirements for creative dramatics are a group of children, a qualified leader, an area large enough for the children to move about freely, and an idea or story from which to create.

Miss Winifred Ward (*8*), founder of many children's dramatic activities in the United States, believes that participation in creative dramatics may aid children socially, emotionally and intellectually. To an extent, these areas of growth are similar to some of the goals in speech correction as stated by Backus and Beasley (*1*). They suggest as a primary aim in speech therapy 'helping each individual to change behavior in interpersonal relationships to the extent that he can function in such relationships with greater relative adequacy in terms of satisfaction and security.' They further suggest that 'group instruction should form the core of speech therapy' and that this makes possible a 'different kind of teaching, changing the structure of the individual teaching situation in that it is now conceived as a supplementary function rather than an isolated entity.' Wendell Johnson (*3*) adds support to this point of view when he says, 'Most children with speech handicaps profit from working in groups, even though they must be examined and evaluated one by one.' Creative dramatics groups conducted by an able teacher provide such a group situation. The authors' clinical experience suggested that as an adjunct to regular speech therapy many children might profit from creative dramatics and become more willing to use speech in everyday life.

Although there is a lack of research evidence to substantiate the claims for creative dramatics, there is some evidence that children with articulation disorders have reduced the number of consonant errors through participation in speech activities involving the creative dramatics techniques suggested by Ward (*8*) and Siks (*6*). Ludwig (*4*) showed that a group of

Barbara M. McIntyre (Ph.D., University of Pittsburgh, 1957) is Assistant Professor of Speech at the University of Pittsburgh and is in charge of a Children's Dramatic Activities Program. Betty Jane McWilliams (Ph.D., University of Pittsburgh, 1953) is Assistant Professor of Speech and Psychology at the University of Pittsburgh and Director, Speech Clinic, Children's Hospital, Pittsburgh, Pennsylvania.

kindergarten children exposed to stimulation through the medium of creative dramatics activities for a period of three months made significantly greater improvement in articulation than did their control group. A study by McIntyre (5) revealed that a group of children between the ages of 10 and 14 significantly reduced the number of articulation errors during a six-week creative activities program involving creative dramatics with no special emphasis upon articulatory skills.

Program

The Speech Clinic of the University of Pittsburgh has utilized creative dramatics as a frequent adjunct to therapy for several years. Early in 1952 classes in creative dramatics were established at the University as part of the teacher-training program. Four different groups met once a week after school. At this time the Director of the Children's Division of the Speech Clinic and the Director of the Creative Dramatics Program talked together. It was decided that certain children who were receiving therapy in the Speech Clinic were in need of some group speech experience which might help bridge the gap between the clinic and everyday speech. It was felt that these children might enjoy the creative group experience with children whose speech was considered normal and that they might thus gain some needed confidence in their speech ability. Several children with articulation and stuttering disorders enrolled in the creative dramatics classes. The teacher made no attempt to be a therapist for these children. They joined in as full-fledged members of the group. No attention was drawn to their speech as they participated in creative dramatics. An example from these classes may serve to illustrate the correlation of creative dramatics to speech correction:

Bobby was a seven-year-old whose articulation problem had discouraged him from speaking. In school the teacher reported that he didn't speak at all. His family heard him talk at home, but he explained that he didn't like to talk because he was constantly asked to repeat. This problem he solved by not speaking when he was outside his home or the clinic. He worked hard in the clinic where he felt that he would not have to repeat too frequently. Bobby joined a creative dramatics class. For three months neither the teacher nor the children in the class heard him say a word. He did, however, join in the activity when no speech was required. He appeared to enjoy the class, and his mother reported that he always wanted to attend. One day Bobby volunteered to play a part which would involve some speech. The teacher watched carefully as the time came for him to talk. His speech was accompanied by much pantomimic action, and the children did not ask him to repeat. In fact, they accepted his speech in the same manner as they accepted the speech of the others. Bobby smiled as he left the class that day. 'I'll try again,' he said to his teacher. This child never attempted to play a main part. He volunteered only for the small roles. However, he did try and he did speak. Gradually it was noted that he talked to the other children. Sometimes he had to repeat but he did so with better grace than previously.

Psychotherapy

Children with disorders of speech, regardless of what type they may be, often need some form of psychother-

apy. According to Irwin (2), 'the goal to help Jimmy gain security in a social situation may be more appropriate than how he produces the [s] sound in isolation.' Van Riper (7) states that some 'speech defectives need psychotherapy when their reaction to the speech defect is abnormal.' One of the goals of this treatment is to let the patient 'get the emotional poison out of his system by freely expressing his true feelings.' In the creative dramatics class an opportunity for this type of release is readily available. The child with emotional difficulties may create a character which will enable him to vent his feelings. This he can do in an acceptable manner and receive acclaim from his fellows for his fine characterization. For example, one little girl of 10 always wished to play the 'mean' parts. She would play the witch, the goblin, the mean sister and the wicked step-mother. One day the teacher asked her if she would not like to play the part of Cinderella. She smiled and said, 'No, that's what I have to be at home.' She lived with her parents and her grandparents and two aunts. She was the pride of the family and played the role of the good little girl at all times except in the creative dramatics class where it was acceptable to be otherwise. This particular child had normal speech, but apparently she too was in need of some release.

This need was also evident in a bright eight-year-old, John, who was exhibiting some nonfluency and a great deal of tension related to speech. He joined a creative dramatics group but took a relatively inactive part until one day when the children were playing the story of *King Midas and the Golden Touch*. Most of the children characterized King Midas as a grumpy man but not as a cruel one. Finally, John said he wished to play King Midas. Suddenly the character of the king became completely different. Midas screamed at the servants, hit the table, ordered the impossible, ranted and raved, and almost completely forgot the plot of the story. The children were impressed with this idea of the king, and a discussion followed. Several of the children thought that John had made King Midas too mean. Others thought maybe the previous attempts to play the king had ben too mild. The children turned to John to get his opinion. 'I think King Midas was a very cruel man. He's as mean as my teacher. Anybody who would not look out carefully for his little girl would do like my teacher and yell and throw things. That's why I made him so mean.' When John left class that afternoon, he gave a big sigh and said, 'Gee, didn't we have a good time today?' He was smiling and talking with the other children who were saying that his playing had been good and interesting. John was now more a part of the group, and he had had an opportunity to ventilate feelings without being reproved.

Diagnostic Observation

Creative dramatics may sometimes serve as a diagnostic tool. In the foregoing example, it was obvious that John's teacher presented a real problem to him. Just how real had not been completely realized. John's behavior was reported to his speech clinician who was able to understand better some of John's problems. Since the creative dramatics teacher was not a psychologist, she did not try to analyze the behavior of the child. She was, however, aware that by reporting the behavior of this child factually and immediately to the proper authority (speech clinician or psychologist) a better understanding of the child might result.

Creative dramatics may also provide an opportunity for the children to be observed unobtrusively by clinicians. This situation is a completely different one from the clinic. It is much closer to the situation in which the child finds himself each day. In creative dramatics class the clinician may observe the child's reaction to other children as well as the reaction of other children to him. This may be done without any interruption of the group. The creative dramatics teacher proceeds as usual, forgetting the observer and knowing that her class is providing an opportunity for better study of a child in whom she has an interest.

Auditory Training

Finally, creative dramatics techniques may be used as a method of providing auditory training. Ludwig (*4*) utilized a group of stories in her study with kindergarten children. Each story contained a great deal of emphasis upon one sound. *Sammy Snake*, and his sisters Sally and Sara, formed one story. *The Rabbit Who Wanted Red Wings* was another. Throughout the whole dramatic playing of the stories the children were bathed in a particular sound. In the playing of the story the four steps in ear training suggested by Van Riper (7)—isolation, stimulation, identification and discrimination—were attempted. The situation provided a happy, relaxed atmosphere where listening for the sounds and producing the sounds were important parts of a game. This method is not creative dramatics in the true sense. It is, however, utilizing the creative dramatics method for auditory training. A clinician or teacher who is trained in both speech therapy and creative dramatics is able to adapt herself most readily to such a technique.

Conclusion

Although pure creative dramatics is primarily an art for children and should be kept for that purpose, certain of its elements make it possible to use it therapeutically, particularly in connection with the speech clinic. The physician who is advocating physical therapy for the post-polio patient does so with a specific physical treatment in mind. The speech clinician who advises speech therapy also has a definite aim. However, when the physician advises swimming as an activity to help the patient use his muscles and bridge the gap between therapy sessions and normal activities, he does so because he realizes the therapeutic value of swimming. He does not expect the swimming teacher to be a trained physical therapist. He expects him to be a competent teacher of swimming. In much the same way the speech clinic may suggest the creative dramatics class for a speech-handicapped child. The therapist does not expect the creative dramatics teacher to be a clinician. He expects the teacher to be a competent teacher of creative dramatics who will provide an atmosphere conducive to the finest creative experience from which the child may derive peripheral benefits.

Summary

The value of creative dramatics as an adjunct to speech therapy was demonstrated in a cooperative program offered by the creative dramatics classes and Speech Clinic of the University of Pittsburgh.

References

1. Backus, O., and Beasley, J., *Speech Therapy with Children*. New York: Houghton Mifflin Company, 1951.
2. Irwin, R. B., *Speech and Hearing*

Therapy. New York: Prentice-Hall, Inc., 1953.
3. JOHNSON, W., et al., *Speech Handicapped School Children*. New York: Harper Bros., 1956.
4. LUDWIG, C., The effect of creative dramatics activities upon the articulation skills of kindergarten children. Master's thesis, Univ. of Pittsburgh, 1955.
5. McINTYRE, B. M., The effect of creative activities on the articulation skills of children. *Speech Monogr.*, 1958, 42-48.
6. SIKS, G. B., *Creative Dramatics*. New York: Harper Bros., 1958.
7. VAN RIPER, C., *Speech Correction, Principles and Methods*. New York: Prentice-Hall, Inc., 1954.
8. WARD, W. *Playmaking with Children*. New York: Appleton-Century Croft, 1957.

Clinical Notes

Esther L. Herbert, *Editor*

Cybernetics in the Treatment Of Voice Disorders

Although voice disorders are among the most common problems encountered in the adult speech clinic, the literature offers little in the way of theoretical framework from which to formulate therapy. Psychoanalytic theory as described by Moses in *The Voice of Neurosis*, for example, suggests some solution to those voice problems which are maintained by the presence of severe emotional etiology. As speech therapists, however, we frequently encounter cases in which the individual has successfully solved some emotional problem arising in childhood or adolescence, but who still carries the hallmark of the problem in his misbegotten voice. This voice is no longer maintained by emotional maladjustment, and the therapist's task is primarily a matter of retraining. One approach to therapy for such a disorder is suggested in cybernetic theory.

Cybernetics. The term *cybernetics*, stemming from a Greek word meaning steersman, refers to the self-regulating characteristics of such mechanisms as the human body, guided missiles, thermostatic temperature controls, and the automatic pilot. Other labels referring essentially to this same process are *homeostasis, feedback* and *servo-mechanism.* Basically, this type of self-regulation is established in terms of homing responses to a predetermined baseline. Any noticeable deviation of the mechanism from this baseline triggers off a response causing the mechanism to return to its original position.

In the automatic pilot—a device used to control automatically the flight of large aircraft—any deviations in the course, altitude, or equilibrium of the aircraft cause the device to react by sending stimuli to the control surfaces on the wings and tail. The control surfaces operate to counteract these deviations, thus keeping the craft in proper flying position.

In instances where the cybernetic device loses sight of its baseline, a new behavior pattern results in an effort to re-establish a state of equilibrium. In the more complicated mechanisms this new behavior is in the nature of wide fluctuations and is called *seeking*. Seeking behavior persists until a new equilibrium is established.

Although the above description of self-controlled behavior is usually ascribed to electronic devices, we find some mention of such phenomena operating in the human voice as well. C. T. Brown, in his *Introduction to Speech*, comments on the self-regulating qualities of the voice in terms of audience behavior. Van Riper and Irwin in *Voice and Articulation* state that a fluctuating rather than static voice can be more readily altered by the clinician.

Contributions to Clinical Notes should be addressed to Esther L. Herbert, Los Angeles City Schools, 1822 E. 7th Street, Los Angeles 21, California.

In applying the cybernetic concept to voice therapy, we see that the established baseline is in terms of the pitch, quality and loudness of the patient's present voice. The clinician endeavors to establish a more adequate voice in terms of the new baseline. He often attempts to carry this out by determining optimal pitch and then training the patient to seek the new voice voluntarily. Unfortunately, the old voice too often persists as the reference line and the patient returns to his old habits once he is outside the clinic. It would therefore seem greatly desirable to eliminate the old baseline of the habitual voice, thus inducing seeking behavior, before presenting the new voice.

Therapy. Having obtained medical approval for therapy, the elimination of the habitual baseline can be effectively carried out by means of muscle stretching and pitch variation exercises. In the muscle stretching exercises, the patient holds his head up and back with his mouth open and proceeds to close his mouth repeatedly, touching the blade of the tongue to the hard palate as he does so. The head remains up and back throughout the entire exercise. This activity is designed to exercise the laryngeal muscle group, allowing increased flexibility in the seeking of a new pitch.

Care must be taken not to allow the patient to overexert the laryngeal muscles during the first few exercise periods. Approximately five exercises per session, with three sessions per day, were found suitable for the initial stage of therapy. The activity should then be gradually increased to 25 times per session, three sessions per day. At any sign of muscle soreness, the patient should immediately decrease the exercises to the point at which no irritation occurs.

The second area of the therapy is designed to encourage the patient to lose sight of his habitual pitch and to induce seeking behavior. This approach differs somewhat from the more traditional method of first determining a definite optimal pitch and then training the patient to speak at that new level. Following cybernetic theory, the patient's seeking behavior is encouraged by repeatedly recording his voice at a great many different pitches and qualities, asking him to indicate those which are the most pleasing. Soon the patient becomes proficient at speaking in different voices and indicates that he no longer knows which is his 'normal' speaking voice. The patient thus begins to modify his own voice in the direction of the optimal pitch level of his own choosing.

Role Playing. As the patient begins to speak more and more in the new pitch, he often needs a larger repertoire from which to select better voice quality. Role playing the speech of well-known personalities during oral reading has proven to be effective in this capacity. For example, in the male voice better nasal resonance can be encouraged through the imitation of Ronald Coleman, greater projection by imitation of Winston Churchill, and slower and more distinct rate may be illustrated by the speech of Edward R. Murrow.

Summary. A theoretical framework for voice therapy is suggested in *cybernetics*, the study of automatic self-controlled mechanisms. This suggestion implies that the human voice is self-regulated through stimuli presented in deviations from the habitual voice pattern. These deviations cause the voice to steer back toward its habitual pattern, thus frustrating the therapist's efforts to produce change.

By first eliminating the habitual baseline, and then encouraging seeking behavior for a new baseline, the therapist can more effectively establish better pitch and quality.

WILLIAM M. SHEARER
Northern Illinois University

Group Interview: Initial Parental Clinic Contact

Speech and hearing therapists in public schools, community clinics, and universities find it almost impossible to schedule initial appointments for parents without a long waiting period. A therapist may need to see eight or 10 parents in a schedule that allows only two hours for such interviews. Paradoxically, much interview time is lost because many parents fail to keep their appointments. In our clinic over 20 per cent of the scheduled first interviews are not kept. Therapists are also confronted with the problem of efficient channeling of children and parents into the appropriate professional services. Often intelligence testing, personality evaluation, or a special physical examination of the child should be done before the speech and hearing evaluation.

During the past year our staff has adapted a group interview method developed by H. G. Ginott (Pre-intake selection of motivated applicants in a community clinic, *Social Work*, April, 1959). A parent's first personal contact with the clinic is in a group setting. When a parent telephones the clinic for the first time, the secretary obtains minimal pertinent information and gives an appointment for the parents. The secretary says, 'We can give you an appointment for a week from Friday. This will be a meeting of several parents of children with speech and hearing problems. It will take approximately one hour.' Ten to 12 parents are scheduled for each group; parents have only a short waiting period for their first appointment, usually no longer than two weeks. This is in contrast to our previous waiting period of three to six months.

The group interview is conducted by a speech therapist with another staff member, a psychologist, a social worker, or another speech therapist. (In schools this person may be the school psychologist, social worker, special education teacher, nurse, or classroom teacher.) The staff members meet the parents in the waiting room and invite them into a conference room where they are seated around a large table. Name cards with the child's first name are placed on the table in front of each parent. These cards serve to identify each parent without the use of last names. The cards facilitate free communication, as the parents can refer to each other as 'Tommy's mother' or 'Johnny's father,' *etc.* The proceedings are recorded by a secretary or on tape. Staff members make notations of impressions gained as the parents talk.

The therapist in charge opens the interview by introducing the staff members. He then says to the parents, 'We invited you together so that we could see you as soon as possible. All of you have something in common—children with speech or hearing problems about whom you are concerned. Let's talk about your child. Tell us something about his speech, what he is like as a person, or anything that you think may help us understand him.' Each parent in turn describes his child. By a few leading questions the parents are encouraged to describe their child's speech and behavior. An attempt is made to get information

about the etiology of the child's problem, possible organic involvement, parents' estimate of the child's learning ability, recent speech improvement, and parents' methods of correcting the child's speech.

Parents seem to identify readily with each other. When one mother describes her child's speech, other mothers may nod with understanding and sympathy. Common remarks are: 'My boy's speech is a lot like Johnny's,' or, 'I have the same problem with my girl.' When one mother says, 'My boy gets so mad when we can't understand him!' another mother will respond, 'I know what you mean!'

The therapists listen intently to words, tone and feelings expressed by the parents, and whenever possible, they attempt to reflect feelings of concern and anxiety. Although most parents talk freely, a few find it difficult to present material in a group. The sensitive therapist does not prod; frequently these parents gain enough security from other group members to volunteer additional information at the end of the hour. Impressions gained from the parents' reaction to the group and from the feelings they express about their children are useful in anticipating needs and planning proper services for the parents and children.

When all the parents have talked, the therapist in charge outlines the clinic procedure. The therapist explains that an individual parent interview is the next step; he describes the various testing procedures for children, and states that recommendations will be given the parents at the conclusion of the study. After the meeting, staff members review the parents' remarks, compare impressions, and determine what services are needed and in what order they should be scheduled.

Therapists must evaluate parents' relationship with a child, their ability to understand and willingness to carry out recommendations. For example, often a parent will overrate and overemphasize a trait when he fears a deficiency. When Mrs. Jones talked about Johnny, she repeated several times, 'The doctor says Johnny is smart. I know if he could only talk better he'd do all right in everything.' These remarks, combined with statements about Johnny's slow general development, point to a need for intelligence testing. It would seem that this mother suspects mental retardation but cannot face it and, therefore, will probably have difficulty in accepting test findings. These initial impressions will help the therapist plan an effective counseling approach.

The following example illustrates parents who will be accepting of test findings and recommendations: Patty's mother and father attended the group interview. They shared equally in the presentation, supporting each other warmly. The mother stated, 'We tried to help Patty by telling her to stop and start over, not to hurry when she talked, but this advice seemed to bother her so we gave it up.' The father said, 'We hope you'll be able to tell us how we can help Patty as there must be something we are not doing right.' It would seem that these parents have a warm relationship with their child. They are sensitive to Patty's feelings and appear aware that they play a part in her speech problem; they will probably be able to utilize counseling after a speech and hearing diagnosis is obtained.

After using the group interview for over a year, we have found that this method enables the clinic to provide

an immediate interview with parents, saves staff time, and aids in formulating a tentative diagnosis plan for each child and parent. It would seem that, with modifications, this method of group interview could be beneficially incorporated into many clinic and public school programs.

D. Kenneth Wilson
Haim G. Ginott
Shirley L. Berger
Child Guidance and Speech Correction Clinic
Jacksonville, Florida

Selected Bibliography On Voice Disorders

Bernard A. Landes

Literature in the areas of medicine, music, psychology and speech contains frequent references to voice production in its various aspects. To present an exhaustive bibliography of these references would constitute a Herculean task. The bibliography attempts to present representative articles of both historical and practical interest. All entries were published in English, and no attempt is made to note unpublished works or books.

1. Abrams, A., Note on a simple method of curing aphonia. *Ther. Gaz.*, 22, 1898, 726.
   Cases of aphonia and dysphonia are reported cured by the topological application of a refrigerant to the neck in the vicinity of the laryngeal nerve.
2. Allen, B., and Peterson, G. E., Laryngeal inflammation in a case of falsetto. *J. Speech Dis.*, 7, 1942, 175-178.
   Inflammation of the vocal cords may be chiefly the result of the voice disorder rather than the cause of it.
3. Allport, G. W., and Cantril, H., Judging personality from voice. *J. soc. Psychol.*, 5, 1934, 37-55.
   Information about the speaker's personality is validly perceived by listeners.
4. Amsdell, H. F., Modern principles of voice training. *Quart. J. pub. Spkg*, 2, 1916, 275-285.
   Critical evaluations are presented of seven books (1908-1915) on voice training.
5. Andrade Pradillo, J., Cramps of the professional voice. *Arch. Otolaryng., Chicago*, 66, 1957, 624-628.
   Etiology and pathogenesis of vocal cramps are like those of other cramps elsewhere in the body.
6. Arnold, G. E., Dysplastic dysphonia: minor anomalies of the vocal cords causing persistent hoarseness. *Laryngoscope, St Louis*, 68, 1958, 142-158.
   A case of double vocal cords is described as one type of disturbance giving rise to dysplastic dysphonia.
7. Ash, J. E., and Schwartz, L., The laryngeal (vocal cord) node. *Trans. Amer. Acad. Ophthal. Oto-laryng.*, 48, 1943, 323-332.
   Surgical removal of nodes is the only treatment, although there is some possibility of recurrence. Observations are based on study of 138 cases caused by vocal abuse.
8. Babbett, J. A., Some of the aspects of aphonia, psychic and otherwise. *Ann. Otol., etc., St Louis*, 32, 1923, 879-885.
   Discussion of etiological factors including one case who coughed up both arytenoid cartilages and regained relatively normal voice.
9. Badcock, M., Speech therapy for certain vocal disorders. *J. Laryng.*, 57, 1942, 101-112.
   Full discussion of etiology and treatment of voice after laryngectomy, functional aphonia, functional dysphonia, voice of the deaf.
10. Baker, D. C., Contact ulcers of the larynx. *Laryngoscope, St Louis*, 64, 1954, 73-78.
    Treatment of choice is voice therapy. Discussion of etiology, symptoms and diagnosis.
11. Bangs, J. L., and Freidinger, A., A case of hysterical dysphonia in an adult. *J. Speech Hearing Dis.*, 15, 1950, 316-323.
    Discussion of previous literature on

Bernard A. Landes (Ph.D., University of Michigan, 1958) is Assistant Professor of Speech and Director of the Speech and Hearing Clinic, Texas Technological College, Lubbock, Texas.

the subject. Presentation of a case with complete therapy outlined.

12. Bangs, J. L., and Freidinger, A., Diagnosis and treatment of a case of hysterical aphonia in a 13-year-old girl. *J. Speech Hearing Dis.*, 14, 1949, 312-317.

Presentation of complete case history of a girl who was not helped by hypnosis or sodium amytal. Good results were obtained by treating the problem as an organic one.

13. Barlow, R. A., A newer concept of hysterical aphonia. *Trans. Amer. laryng. Ass.*, 52, 1930, 23-34.

Hysterical aphonia is a symptom complex that indicates a failure of the patient to adjust to his surroundings; the extreme reaction is suicide.

14. Barr, T., Hoarseness. *Tex. St. J. Med.*, 34, 1938, 553-555.

Differential diagnosis in hoarseness is important because of variety of possible causes.

15. Barrington, J. W., Voice culture for the boy. *Etude*, 42, 1924, 200-201.

Breathing exercises are given to enhance 'midriff' and 'rib' breathing rather than 'collar-bone' breathing.

16. Bartholomew, W. T., The paradox of voice teaching. *J. acoust. Soc. Amer.*, 11, 1940, 446-450.

The most important aspect of good voice production is the 'large throat,' which includes a slightly depressed larynx, widened pharynx and relaxed tongue.

17. Bartholomew, W. T., A physical definition of 'good voice-quality' in the male voice. *J. acoust. Soc. Amer.*, 6, 1934, 25-33.

Good voice quality is described in terms of vibrato, position of the low formant and position of the high formant.

18. Bartholomew, W. T., The role of imagery in voice teaching. *Music Tchrs Nat. Ass. Proc.*, 30, 1935, 78-94.

The study and teaching of voice are neither wholly physical nor wholly esthetic; a knowledge of both physics and esthetics is necessary.

19. Bartholomew, W. T., A survey of recent voice research. *Music Tchrs Nat. Ass. Proc.*, 32, 1937, 115-138.

An attempt is made to formulate suggestions for voice training from a review of 103 references on voice research.

20. Beighley, K. C., What the experts say about nasality. *Quart. J. Speech*, 29, 1943, 199-206.

An objective review of 44 references on nasality includes opinions on definition and types, causes, velar action, velar closure and correction.

21. Bell, A. M., The 'nasal twang.' *Mod. Lang. Notes*, 5, 1890, 75-76.

Therapy for nasality consists of ear training, separation of nasal consonant from adjoining vowel, and work on palatal valve to stop excess air from escaping.

22. Berry, R. Z., and Carter, D. S., Buckshot wound of a vocal cord. *Arch. Otolaryng., Chicago*, 67, 1958, 624-625.

A patient who had been shot in a hunting accident was asymptomatic except for a moderate hoarseness. Normal voice returned after endoral surgical removal of the shot.

23. Birrell, J. F., Hoarseness in childhood. *Speech*, 18, 1954, 40-47.

In view of the way in which most children abuse their voices during every waking hour, the author feels that it is remarkable that more hoarse voices are not produced.

24. Blanton, M. G., The relation of emotional states to vocal defects. *Quart. J. pub. Spkg*, 2, 1916, 352-357.

Psychoanalytic presentation of two cases of hysterical dysphonia, one from the author's notes and one from those of Freud.

25. Blanton, S., The voice and the emotions. *Quart. J. pub. Spkg*, 1, 1915, 154-172.

Unpleasant emotions disturb breathing and therefore affect voice. More pleasant emotions ease the muscles and relax the throat.

26. Bloomer, H. H., and Shohara, H., Speech disorders among European military personnel in World War I: Part 1. *J. Speech Hearing Dis.*, 16, 1951, 351-366.

Review of 57 articles from foreign literature regarding all types of aphonia and dysphonia reported from the first World War.

27. Boland, J. L., Jr., Voice therapy for hoarse voice. *J. Okla. med. Ass.*, 46, 1953, 109-113.

Therapy should include voice training, relaxation training and counselling. 381-385.

28. Bottome, F. A., The treatment of hoarseness in singers and public speak-

ers. *Laryngoscope, St Louis,* 4, 1898, 381-385.

Vocal nodules result from faulty method of singing. Treatment for hoarseness is medication and vocal rest followed by vocal instruction.

29. Brodnitz, F. S., Voice problems of the actor and singer. *J. Speech Hearing Dis.,* 19, 1954, 322-326.

Discussion of professional voice problems. Complete coverage of most types of disorders resulting from professional use and abuse of the voice.

30. Brodnitz, F. S., Vocal rehabilitation in benign lesions of the vocal cords. *J. Speech Hearing Dis.,* 23, 1958, 112-117.

Vocal exercises form only a part of voice re-training; included also are psychological consultation, drug therapy and physical therapy such as faradic stimulation of the involved parts.

31. Brodnitz, F. S., and Froeschels, E., Treatment of nodules of vocal cords by chewing method. *Arch. Otolaryng., Chicago,* 60, 1954, 560-565.

Presentation of methods of therapy for vocal nodules from 1868 to 1954, culminating in report of success with the chewing method.

32. Brody, M. W., Neurotic manifestations of the voice. *Psychoanal. Quart.,* 12, 1943, 371-380.

Subtle deviations of voice quality are held to be significant in psychoanalysis. Presentation of several cases illustrating dramatic changes in voice.

33. Brown, H. H., Standardization of vocal training from the teacher's standpoint. *Laryngoscope, St Louis,* 23, 1913, 21-28.

Faulty breathing patterns are at the root of most voice disorders. Effortless vegetative breathing will not suffice for speaking.

34. Bryan, D., Speech and castration: two unusual analytic hours. *Int. J. Psycho-Anal.,* 6, 1925, 317-323.

Verbatim report of two hours of psychoanalysis with an aphonic adult. His feelings are traced until voice returns at the end of the session.

35. Bryant, B. L., A new apparatus for treating singers and public speakers. *Laryngoscope, St Louis,* 42, 1932, 393-395.

Apparatus coordinates massage and faradic stimulation of the larynx, to be used to alleviate hoarseness in either trained or untrained speakers.

36. Bryant, B. L., Phonasthenia and its treatment by electropneumotherapy. *Laryngoscope, St Louis,* 43, 1933, 607-617.

Author advocates correction of improper respiration, articulation and pitch for mild cases; faradic current is used for chronic cases of phonasthenia.

37. Bullen, A., Nasality: cause and remedy of our American blight. *Quart. J. Speech,* 28, 1942, 83-84.

Americans have a near-monopoly on nasality because their forefathers had difficulty with the new language and slovenly articulation of the velum resulted.

38. Bullis, R. O., and Kisselburgh, A., Vocal techniques for treatment of certain speech difficulties. *Ann. Otol., etc., St Louis,* 64, 1955, 445-450.

Combination of raised larynx during phonation and faulty position of the tongue produces a large proportion of laryngeal complications.

39. Bunker, H. A., Jr., The voice as (female) phallus. *Psychoanal. Quart.,* 3, 1934, 391-429.

Voice is not only a major secondary sex character, but also serves to reflect emotional conflict.

40. Cadwallader, B., Elimination of speech and voice defects. *Laryngoscope, St Louis,* 24, 1914, 986-992.

Low position of the larynx adds resonance, good tone quality to the voice; larynx should be pulled down anteriorly during phonation.

41. Carpenter, E. W., and Carpenter, W. M., Chronic hoarseness. *J. S. C. med. Ass.,* 33, 1937, 287-291.

Every case of unexplained hoarseness lasting more than a few weeks should be considered cancer until proved otherwise.

42. Casselberry, W. E., A discussion on laryngeal disturbances produced by voice use. *J. Laryng.,* 21, 1906, 528-534.

Presentation of 11 cases illustrating the subject.

43. Clerf, L. H., and Braceland, F. J., Functional aphonia. *Trans. Amer. laryng. rhin. otol. Soc.,* 48, 1942, 69-78.

Hysterias are easily detected and are amenable to suggestion by the therapist.

44. Coleman, L. D., Psychosomatic aspects of diseases of the ear, nose, and throat. *Laryngoscope, St Louis,* 59, 1949, 709-720.

Author cautions against treatment of the symptoms in hysterical cases in order to prevent production of another conversion symptom.

45. Crews, L. Mc., A case of juvenile voice. *Proc. Amer. Speech Cor. Ass.*, 6, 1936, 142-149.

Therapy consists of relaxation, complete silence, deep rhythmical breathing, followed by spontaneous production of normal tone.

46. Crouch, C. P., A suggested treatment for functional aphonia. *Bristol med.-chir. J.*, 25, 1907, 214-218.

Starting with whatever note the patient can phonate, gradually build it up to a stronger note, then eventually to speech.

47. Curry, E. T., Voice breaks and pathological larynx conditions. *J. Speech Hearing Dis.*, 14, 1949, 356-358.

Reports of findings of wave-to-wave analysis of voice breaks during mutation.

48. Curry, R., Discussion on functional disorders of the voice. *Proc. roy. Soc. Med.*, 32, 1939, 453-454.

Singers depress the larynx to render internal muscles lax and therefore produce a lower tone. High tones involve raising and tensing the larynx.

49. Damitz, J. C., and Dill, J. L., Chronic hoarseness: report of three hundred consecutive cases. *Ann. Otol., etc., St Louis*, 49, 1940, 996-1007.

Vocal cord paralysis and chronic nonspecific laryngitis make up two-thirds of all cases of hoarseness.

50. Douglas, T. E., Jr., Hoarseness. *Northw. Med., Seattle*, 49, 1950, 383-385.

Discussion of organic pathologies that can first manifest themselves through the symptom of hoarseness.

51. Drake, O. J., Toward an improved vocal quality. *Quart. J. Speech*, 23, 1937, 620-626.

General discussion of the literature plus empirical evidence on breathing in voice production, and on timing and nasality.

52. Duncan, M. H., Personality adjustment techniques in voice therapy. *J. Speech Dis.*, 12, 1947, 161-167.

General discussion of psychological therapy methods with patients with hoarse voices.

53. Dundas-Grant, Sir J., Case of functional aphonia. *Proc. roy. Soc. Med., Sect. of laryng.*, 17, 1923, 10.

The patient is instructed to press his hands together against force; this causes vocal cords and ventricular bands to approximate.

54. Eijkman, L. P. H., The soft palate and nasality. *Neophilologus*, 11, 1926, 207-218.

Nasalization of a speech sound is independent of the distance between the velum and the back wall of the pharynx.

55. Eijkman, L. P. H., The soft palate and nasality. *Neophilologus*, 11, 1926, 277-278.

It is not the small nasal passage, but the formation of a small resonance cavity because of the passage that is important in nasality.

56. Eijkman, L. P. H., More soft palate and nasality. *English Studies*, 10, 1928, 114-118.

Nasal quality is generated somewhere between the vocal cords and the back of the nose, *i. e.*, the mesopharynx. Air must pass through the nose to produce nasality.

57. Felderman, L., Food and the voice. *Etude*, 53, 1935, 507.

Tobacco, in moderation, is not harmful to the voice; alcohol should be avoided altogether for best vocal quality.

58. Ferguson, G. B., Organic lesions of the larynx produced by misuse of the voice. *Laryngoscope, St Louis*, 65, 1955, 327-336.

Hyperfunctional abuse of the voice often leads to organic lesions of the vocal cords. Hypofunctional, pseudoparetic disorders seldom cause lesions.

59. Feuchtinger, E., A new method of training the voice. *Quart. J. Speech Educ.*, 4, 1918, 93-102.

New method trains muscles that stretch the cords; most voice defects are blamed on weak muscles which must be trained.

60. Fleming, C. N., Preserving the young voice. *Etude*, 53, 1935, 542.

Children should not be allowed to sing while undergoing mutation, nor should they ever be allowed to force their voices into high or low ranges.

61. Frank, D. I., Hoarseness—a new classification and a brief report of four interesting cases. *Laryngoscope, St Louis*, 50, 1940, 472-478.

Author proposes 12 categories of hoarseness, grouped according to etiol-

ogy.

62. Freud, E. D., Voice and breathing. A report on some new concepts. *Arch. Otolaryng., Chicago, 67*, 1958, 1-7.

The author presents a discussion of the controversy between the proponents of the neurochronaxic theory of voice physiology and those of the myoelastic theory.

63. Friedman, E. D., Neurological aspects of hoarseness. *N. Y. St. J. Med.*, 34, 1934, 48-50.

In early stages of vocal cord paralysis, the affected cord lies in the midline because the abductor muscle is paralyzed first, invariably.

64. Froeschels, E., Chewing method as therapy. *Arch. Otolaryng., Chicago, 56*, 1952, 427-434.

This method works instantaneously in many voice troubles, changing an abnormal voice into a normal one. The method must be learned by observation of an experienced therapist.

65. Froeschels, E., Experiences of a bloodless treatment for recurrens-paralysis. *J. Laryng.*, 59, 1944, 347-358.

The 'pushing method' is found effective in treating some cases of vocal cord paralysis. Brief presentation of 15 successfully treated cases.

66. Froeschels, E., Hygiene of the voice. *Arch. Otolaryng., Chicago*, 38, 1943, 122-130.

Presentation of the rationale, evolution, and application of the 'chewing method' which was used successfully with preschool children.

67. Froeschels, E., Laws of the occurrence and development of hyperfunctional voice failure. *Speech*, 3 (1), 1937, 13-17.

Hyperfunctions of voice can occur at any one of seven points from the subglottal level to the lips.

68. Froeschels, E., Laws in the appearance and development of voice-hyperfunctions. *J. Speech Dis.*, 5, 1940, 1-4.

A well-trained ear can locate the site of a hyper- or hypofunction on the basis of acoustical information.

69. Froeschels, E., Nose and nasality. *Arch. Otolaryng., Chicago, 66*, 1957, 629-633.

Both hyperrhinolalia and hyporhinolalia can be either functional or organic. Differential diagnosis is important.

70. Froeschels, E., Psychogenic impediments of the voice. *Laryngoscope, St Louis*, 49, 1939, 1225-1230.

Some voice impediments do not show the physiological signs that the acoustic symptoms would indicate; these are psychogenic.

71. Froeschels, E., Kastein, S., and Weiss, D. A., A method of therapy for paralytic conditions of the mechanisms of phonation, respiration, and glutination. *J. Speech Hearing Dis.*, 20, 1955, 365-370.

The 'pushing method' is applied to patients with velar paralysis, abductor and adductor paralysis, diseases of the CNS, *etc.*

72. Gifford, M. F., The necessity of speech and voice re-education, with special reference to nasality. *Laryngoscope, St Louis*, 35, 1925, 317-323.

Nasality is divided into open, closed, and mixed, each category having several subdivisions based on etiology.

73. Gifford, M. F., Speech defects. *J. Amer. med. Ass.*, 82, 1924, 1673-1675.

Among the 10 categories of speech defects are organic and non-organic voice defects. A description of each category is given.

74. Glasgow, G. M., The effects of nasality on oral communication. *Quart. J. Speech*, 30, 1944, 337-340.

Voice quality is a vital factor in the communication of percepts, concepts and larger thought complexes.

75. Glassburg, J. A., Postadenoidal speech. *Arch. Otolaryng., Chicago*, 4, 1926, 296-297.

Hypernasality may occur after adenoidectomies because nasopharyngeal space has become widened to accommodate the adenoid masses.

76. Glassburg, J. A., Throat stiffness and the voice. *Laryngoscope, St Louis*, 35, 1925, 469-472.

Vocal nodules result from accumulation of mucus as a result of pressure on the ducts of the lubricating glands of the vocal cords.

77. Glassburg, J. A., The voice in singing and speaking. *Arch. Otolaryng., Chicago*, 7, 1928, 627-630.

Singing and speaking are closely associated, but are different processes requiring different methods of training.

78. Glogau, O., Falsetto voice. *Laryngoscope, St Louis*, 23, 1913, 787-788.

Brief presentation of case of falsetto in a 20-year-old male. The voice dis-

order appeared immediately following a tonsillectomy.

79. GLOGAU, O., Functional aphonia. *Laryngoscope, St Louis*, 23, 1913, 145-146.
Brief presentation of functional aphonia in an adult female, cured by shock by the spark of a high frequency current.

80. GLUSHAK, L., Dysphonia spastica (spastic hoarseness). *Laryngoscope, St Louis*, 38, 1928, 273-278.
The cramp in the glottis is provoked on attempting phonation, producing great stress and causing a toneless, almost whispered voice.

81. GOLD, L. H., and GAROFALO, M. L., The treatment of aphonia by the intravenous administration of pentothal sodium. *Anesthesiology*, 1, 1940, 94.
This is the first report in the literature of hysterical aphonia being treated by this drug. Normal voice was produced in 10 days.

82. GREENE, J. S., Dysphemia and dysphonia. *Arch. Otolaryng., Chicago*, 26, 1937, 74-82.
Stuttering, hysterical aphonia, and falsetto voice are compared on the basis of similarity of etiology and personality manifestations.

83. GREENE, J. S., The falsetto voice in the male—with a demonstration of four cured cases. *Laryngoscope, St Louis*, 31, 1921, 33-41.
General discussion of mutation and falsetto voice with four illustrative case histories.

84. GREENE, J. S., Functional aphonia. *Trans. Amer. laryng. rhin. otol. Soc.*, 48, 1942, 80-82.
In the case of hysterical aphonia we must determine from what emotional situation the patient is trying to escape.

85. GREENE, J. S., Psychiatric therapy for dysphonia. *Arch. Otolaryng., Chicago*, 28, 1938, 213-221.
A disorder can never be called either functional or organic; all phases of the patient's makeup must be considered.

86. GREENE, J. S., Psychiatric therapy in dysphemia and dysphonia: stuttering, psychophonasthenia, aphonia, falsetto. *Ann. Otol., etc., St Louis*, 47, 1938, 615-631.
Psychiatric measures should be directed toward bringing the patient's unconscious motives into the consciousness.

87. GREENE, J. S., Psychophonasthenia syndrome. *Ann. Otol., etc., St Louis*, 50, 1941, 1177-1184.
Voice training should accompany psychotherapy which includes the development of a more mature, more integrated personality. Presentation of five cases.

88. GREENE, J. S., Vocal and verbal syndromes: their rhinolaryngologic significance. *Arch. Otolaryng., Chicago*, 31, 1940, 1-6.
Just as there are characteristic physical alterations peculiar to certain pathologic conditions of the larynx, so are there vocal alterations.

89. GUTHRIE, D., Discussion on functional disorders of the voice. *J. Laryng.*, 54, 1939, 261-264.
Recovery from many functional dysphonias may be promoted by a cold compress and massage of the neck in the region of the larynx, in addition to medication.

90. GUTHRIE, D., Discussion of functional disorders of the voice. *Proc. roy. Soc. Med.*, 32, 1939, 447-449.
Emotional factors of phonasthenia may often be overcome by simple suggestion without a deep understanding of psychiatry.

91. GUTHRIE, D., The pathology of speech and voice. *Edinb. med. J.*, 47, 1940, 391-405.
Speech production is never a purely mechanical problem. Discussion of nasality with therapy consisting of blowing exercises.

92. HALLOCK, W., and MUCKEY, F. S., The result of 18 years of research work on voice production and analysis. *Laryngoscope, St Louis*, 23, 1913, 5-20.
Extrinsic muscles may interfere with proper tone production by altering shape and size of resonating cavities.

93. HANLEY, C. N., and MANNING, C. C., Voice quality after adenotonsillectomy. *J. Speech Hearing Dis.*, 23, 1958, 257-262.
Judges agree that a greater degree of hypernasality is present after tonsillectomy than is heard prior to surgery.

94. HATTORI, S., YAMAMOTO, K., and FUJIMURA, O., Nasalization of vowels in relation to nasals. *J. acoust. Soc. Amer.*, 30, 1958, 267-274.
Harmonic analysis of conscious nasalization is interpreted physically in terms of formant regions.

95. HEDRICK, J., A new nomenclature for

nasality. *Volta Rev.*, 21, 1919, 538-540.
Review of various usages of the term 'nasality' and proposal of 'clear nasality,' 'dull nasality,' and 'inhibited nasality.'

96. Heltman, H., Reeducation in speech correction. *Proc. Amer. Speech Cor. Ass.*, 6, 1936, 130-141.
Coughing and clearing the throat often provide the stimuli for therapy with aphonia, hoarseness, falsetto and nasality.

97. Henderson, W. J., The need of a standard in voice production. *Laryngoscope, St Louis*, 23, 1913, 1-4.
Teachers and pupils alike operate with no clear idea of terminology and this often leads to misuse of the vocal musculature.

98. Henley, H., Training the male voice. *Etude*, 54, 1936, 46.
Training of the male singing voice differs from training of the female singing voice; the male usually manifests a break in going from soft to loud.

99. Henrikson, E. H., and Thaler, M., Assumptions and their relation to the use of speech drills. *Quart. J. Speech*, 31, 1945, 229-230.
Any drill is necessarily based on a large number of assumptions; we must be aware of these assumptions, therefore, in using drills.

100. Higguet, D., Hysterical aphonia. *J. Laryng.*, 5, 1891, 345-346.
Brief presentation of hysterical aphonia in a 17-year-old girl, successfully treated by compression of the ovaries.

101. Hobbs, A. G., The voice and its treatment. *J. Laryng.*, 5, 1891, 441-449.
Various pathological conditions of the pharynx, nasopharynx and nares may contribute to defects of resonance.

102. Holmes, F. D. L., The qualities of the voice. *Quart. J. Speech*, 18, 1932, 249-255.
Every acoustical phenomenon must have an acoustical cause. Many times infra-glottal resonance is the only demonstrable cause.

103. Holt, W. L., A case of unchanged boy's voice in a man which was made normal by singing exercises. *Laryngoscope, St Louis*, 18, 1908, 389-390.
Patient was instructed in the vigorous use of the lungs through breathing exercises; this produced a lasting lowered voice.

104. Horsford, C., Why voices fail. *Practitioner*, 89, 1912, 574-578.
Voices fail because of abuse or organic pathology. Throatiness can result from rigidity of structures.

105. Howard, C. N., Report of a case of functional aphonia cured under general anesthetic. *J. Amer. med. Ass.*, 80, 1923, 104.
Patient was anesthetized with ether; speech was encouraged as he awoke until voice returned to normal.

106. Hultzen, L. S., Apparatus for demonstrating nasality. *J. Speech Dis.*, 7, 1942, 5-6.
Author uses contact microphone fitted over the nose and connected with a loudspeaker. In normal voices, the oral component masks the nasal component.

107. Hunt, M., A discussion on laryngeal disturbances produced by voice use. *J. Laryng.*, 21, 1906, 519-528.
Laryngeal disturbances can result from prolonged use of voice, violent use, or unnatural pitch or manner.

108. Imperatori, C. J., Contact ulcer of the larynx. Report of a case. *Laryngoscope, St Louis*, 43, 193, 933-939.
Report of a case treated by surgery and vocal rest, with resulting healing of the ulcer. Contact ulcer may be related to pachydermia laryngis.

109. Jackson, C., Contact ulcer of the larynx. *Ann. Otolo., etc., St Louis*, 37, 1928, 227-230.
First available report on contact ulcer. Discussion of definition, incidence, etiology, pathology, symptomatology, diagnosis, treatment.

110. Jackson, C., The larynx and the voice. *Etude*, 55, 1937, 501.
Tobacco and alcohol should never be used by those who use their voices professionally.

111. Jackson, C., Psychosomatic aphonia and ephemeral adductor paralysis. *Laryngoscope, St Louis*, 59, 1949, 1287-1298.
The most common cause of psychosomatic aphonia is psychic trauma originating in an ephemeral adductor paralysis due to anemia.

112. Jackson, C., and Jackson, C. L., Contact ulcer of the larynx, *Arch Otolaryng., Chicago*, 22, 1935, 1-15.
Regime of silence is the most important aspect of treatment for contact ulcer, although surgery is sometimes necessary.

113. Jackson, C., and Jackson, C. L., Dysphonia plicae ventricularis. *Arch. Otolaryng., Chicago*, 21, 1935, 157-167.
Phonation with the ventricular bands is rather frequent and usually unrecognized. It usually causes hoarseness; however, it may have to be encouraged if the vocal cords are inoperative.

114. Jackson, C. L., The voice after direct laryngoscopic operations, laryngofissure, and laryngectomy. *Arch. Otolaryng., Chicago*, 31, 1940, 23-36.
Discussion of results of survey taken of many patients who had undergone one of the operations.

115. Jervey, J. W., Contact ulcer of the larynx, a personal experience. *Ann. Otol., etc., St Louis*, 55, 1946, 431-433.
The writer, an otolaryngologist, reports his subjective impressions on having a contact ulcer; complete vocal rest is advocated.

116. Johansen, H., and Kiaer, W., Contact ulcers and laryngeal tuberculosis. *Arch. Otolaryng., Chicago*, 50, 1949, 264-283.
Any patient with a contact ulcer should be suspected of having tuberculosis until this disease is definitely refuted.

117. Jones, H. E., The adolescent growth study. VI. The analysis of voice records. *J. cons. Psychol.*, 6, 1942, 255-256.
The analysis of voice recordings by Paul Moses agrees substantially with analyses obtained through the Rorschach and TAT tests.

118. Josephson, E. M., The physiology of the 'false' vocal cords and the anatomy of the thyroarytenoid muscle and of the thyro-epiglottic ligament. *Arch. Otolaryng., Chicago*, 6, 1927, 139-152.
A study of the indicated mechanism indicates that there is a four-fold system for the mobilization of the false cords.

119. Kantner, C. E., Four devices in the treatment of rhinolalia aperta. *J. Speech Dis.*, 2, 1937, 73-76.
Author discusses use of balloon blowing exercises, manometric flame apparatus, wet spirometer.

120. Kenyon, E. L., The nasal voice with reference to its bearing on the practice of rhinolaryngology. *Ann. Otol., etc., St Louis*, 22, 1913, 1110-1120.
The nature and cause of nasal and denasal voices is thought to be satisfactorily established after many years of research.

121. Kosh, Z. H., An integrated course for stutterers and voice defectives. *Quart. J. Speech*, 27, 1941, 97-104.
Voice and speech are considered one facet of personality and are worked on when patients are ready to accept criticism.

122. Laing, J. M., Therapy techniques for better nasal resonance. *J. Speech Hearing Dis.*, 23, 1958, 254-256.
Three uses of the contact microphone are described for enhancing nasal resonance.

123. Landes, B. A., and McCabe, B. F., Dysphonia as a reaction to cigarette smoke. *Laryngoscope, St Louis*, 67, 1957, 155-156.
A brief case history is presented of an adult female who reacted to cigarette smoke by an instantaneous hoarseness which persisted only so long as she was in the vicinity of the smoke.

124. Lell, W. A., Diagnosis and direct laryngoscopic treatment of functional aphonia. *Arch. Otolaryng., Chicago*, 34, 1941, 141-149.
The tip of the laryngoscope is used to prop the ventricular bands apart. Resulting pressure causes vocal cords to approximate in spasm.

125. Leszynsky, W. M., Hysterical aphonia and hysterical mutism. *Laryngoscope, St Louis*, 6, 1899, 97-99.
Brief presentation of case of recurring hysterical aphonia which was relieved daily by faradic stimulation, only to recur the next day.

126. LeTellier, F. S., Some conditions causing hoarseness. *J. Tenn. med. Ass.*, 26, 1933, 197-199.
Causes of hoarseness: excessive use, traumatism, foreign bodies, neoplasms, paralyses, syphilis, tuberculosis, cancer, enlarged thyroid.

127. Levbarg, J. J., Hoarseness, especially as affecting singers. *N. Y. med. J.*, 107, 1918, 744.
Brief presentation of seven cases of hoarseness with apparently different etiologies.

128. Levbarg, J. J., Hypnosis, a potent therapy for certain disorders of voice and speech. *Arch. Otolaryng., Chicago*, 30, 1939, 206-211.
Hypnosis is considered one of the most practical sciences of the day. Report of 75 speech and voice cases on whom hypnosis was used successfully.

129. LEVBARG, J. J., Vocal therapy versus surgery for the eradication of singers' and speakers' nodules. *Eye, Ear, Nose, Thr. Mon.*, 18, 1939, 81-82.

Vocal nodules can be removed by vocal rest plus voice training. If surgery is necessary, vocal training must follow.

130. LISCHKOFF, M. A., Hoarseness. *J. Fla. med. Ass.*, 22, 1935, 263-265.

Papilloma of the larynx is the most common cause of hoarseness in children; later, tuberculosis and cancer are most common causes.

131. LOEBELL, H., Voice and speech disorders in the German army. *Quart. J. Speech*, 30, 1944, 259-261.

Therapy methods are discussed for functional voice disorders, aphonia and polyps.

132. MACLEOD, E. C., Demonstration of apparatus used to treat functional aphonia and allied disorders. *Proc. roy. Soc. Med.*, 23, 1930, 783-784.

Loss of voice is divided into two categories: true aphonia and hyperphonia. Methods of treatment of each type are presented.

133. MACMAHON, C., A note on the treatment of functional aphonia. *J. Laryng.*, 47, 1932, 243-246.

Discussion of treatment of functional aphonia, phonasthenia, and vocal cord nodes.

134. MACMAHON, C., The treatment of dysphonia and allied conditions. *J. Laryng.*, 54, 1939, 343-349.

Discussion of all aspects of spastic dysphonia, as well as vocal abuse.

135. MCCASKEY, C. H., Aphonia. *Ann. Otol., etc., St Louis*, 55, 1946, 524-530.

Aphonia is a symptom and should not be treated locally. Clinician must find the emotional instability and treat accordingly.

136. MCGEHEE, F., The reliability of the identification of the human voice. *J. gen. Psychol.*, 17, 1937, 249-271.

The study tests factors influencing the ease with which an unfamiliar voice is identified as a function of time, possible choices, *etc.*

137. MAKUEN, G. H., Value of muscle training in treatment of vocal defects. *J. Amer. med. Ass.*, 33, 1899, 888-890.

Directions for exercising specific laryngeal muscles such as the omohyoid, stylohyoid, sternohyoid, *etc.*

138. MANSER, R. B., Voice problems of university students. *Proc. Amer. Speech Cor. Ass.*, 9, 1939, 90-102.

Presentation of 12 cases of hoarseness, nasality and denasality.

139. MARSH, F. D., Functional aphonia, some observations on its clinical aspects. *Lancet*, 223, 1932, 289.

The determining cause of aphonia must be removed, then voice is restored by electrical stimulation, suggestion or instruction.

140. MATSUI, T., The hoarsness of infants and an examination into its cause. *Laryngoscope, St Louis*, 37, 1927, 867-868.

Beriberi is found to be a frequent cause of hoarseness in children if the mother or nurse had the disease.

141. MERRY, G. N., Nasal resonance. *Quart. J. Speech Educ.*, 7, 1921, 171-172.

All speech is characterized by strong, medium or weak nasal resonance.

142. MICHAEL, W., and CRAWFORD, C. C., An experiment in judging intelligence by the voice. *J. educ. Psychol.*, 18, 1927, 107-114.

Intercorrelations among scholarship, intelligence and judged inflections are essentially equal, on the basis of the judgments of one observer.

143. MILLER, F. E., Vocal art science from the standpoint of use and abuse of the voice. *Laryngoscope, St Louis*, 23, 1913, 29-58.

Males should use a standard pitch of 512 cps, and females should use a pitch of 1024 cps. Range should be limited.

144. MILLS, W., The essentials of voice production. *Laryngoscope, St Louis*, 18, 1908, 513-517.

Most Americans lack resonance; therefore, principles of diaphragmatic breathing are important along with directing the voice upward.

145. MILNER, A., Discussion on functional disorders of the voice. *Proc. roy. Soc. Med.*, 32, 1939, 449-452.

A singer's point of view on voice disorders. Singing in the wrong register is often etiological.

146. MITHOFFER, W., Functional aphonia. *Trans. Amer. laryng. rhin. otol. Soc.*, 48, 1942, 79-80.

After being trained in diaphragmatic breathing and in using humming exercises, the patient is told to rotate head against manual pressure for relaxation.

147. MITHOFFER, W., A simple treatment for defects of the singing and of the speaking voice. *Arch. Otolaryng., Chicago,*

31, 1940, 16-22.
Discussion of systemic and local causes of phonasthenia with diaphragmatic breathing and mild faradic current recommended as therapy.

148. Moolenaar-Bijl, A., Functional or organic? *Speech*, 3 (3), 1938, 29-31.
Presentation of a case of rhinolalia mixta resulting from both organic and functional causes.

149. Moore, W. E., Personality traits and voice quality deficiencies. *J. Speech Dis.*, 4, 1939, 33-36.
A study to determine relations between personality traits and voice quality using the Bernreuter Personality Inventory.

150. Moser, H. M., Diagnostic and clinical procedures in rhinolalia. *J. Speech Dis.*, 7, 1942, 1-4.
Methods utilizing nasal olives are described, such as flame tests, diaphragm tests, blowing tests, plus vibration tests and rhinometry.

151. Moser, H. M., Dreher, J. J., and Adler, S., Comparison of hyponasality, hypernasality, and normal voice quality on the intelligibility of two-digit numbers. *J. acoust. Soc. Amer.*, 27, 1955, 872-874.
Hypernasality is most destructive to intelligibility in noise conditions; hyponasality is less destructive.

152. Moses, P. J., Is medical phonetics an essential part of otorhinolaryngology? *Arch. Otolaryng., Chicago*, 31, 1940, 444-450.
Specialists interested in systemic problems will find help in vocal analysis.

153. Moses, P. J., Psychosomatic aspects of inspiratory voice. *Arch. Otolaryng., Chicago*, 67, 1958, 390-393.
The significance of inspiratory voice is presented in terms of feeding and sexual theory. This problem should not be treated without insight into psychodynamics.

154. Moses, P. J., Social adjustment and the voice. *Quart. J. Speech*, 27, 1941, 532-537.
The paper is devoted to the question: what does voice teach us about adjustment and personality?

155. Moses, P. J., Speech and voice therapy in otolaryngology. *Eye, Ear, Nose, Thr. Mon.*, 32, 1953, 367-375.
Discussion of nasality, vocal nodes, contact ulcer, laryngectomy, paralysis and falsetto voices.

156. Moses, P. J., The study of personality from records of the voice. *J. cons. Psychol.*, 6, 1942, 257-261.
Twenty-one attributes of voice are listed, each of which is specially significant in betraying particular personality traits.

157. Moses, P. J., Vocal analysis. *Arch. Otolaryng., Chicago*, 48, 1948, 171-186.
Personality traits are detected by range, register, resonance, rhythm, respiration, pathos, glottal stroke, breathiness, speed and melism.

158. Muck, O., Laryngeal pellet in treatment of aphonia. *J. Amer. med. Ass.*, 76, 1921, 1437.
The lowering of a pellet into the larynx has proved successful in the treatment of aphonia. Resulting fright starts vocal reflex.

159. Muckey, F. S., The work of the voice section of the third annual convention. *Quart. J. Speech Educ.*, 4, 1918, 103-111.
The author challenges Feuchtinger (*59*) on a doctrine which is contrary to fundamental facts of anatomy, physiology and physics.

160. Negus, V. E., The diagnosis and treatment of hoarseness. *Med. J. Aust.*, 2, 1933, 591-595.
Weakness, hyperphonia, roughness of the glottic margins, mechanical obstructions, and interference with resonation may all cause hoarseness.

161. Negus, V. E., The significance of hoarseness. *N. Y. St. J. Med.*, 39, 1939, 9-12.
Various causes of hoarseness are discussed with respect to children, young adults, women and elderly men.

162. Newens, A. M., Improvement of the speaking voice. *Nat. Educ. Ass. J.*, 16, 1927, 269-270.
The singing teacher is not qualified to direct voice improvement; the classroom teacher has the best opportunity.

163. Oaks, L. W., Merrill, H. G., and Oaks, L. E., Recurrent hoarseness and aphonia without demonstrable laryngeal pathology. *Ann. Otol., etc., St Louis*, 41, 1932, 1079-1086.
Recurrent hoarseness and aphonia without other laryngeal pathology may be result of chronic ethmoiditis.

164. Orton, H. B., The significance of hoarseness. *Med. surg. J.*, 103, 1951, 511-515.
List of 96 possible causes of hoarseness. Differential diagnosis is, therefore, important.

165. Orton, H. B., The significance of hoarseness. *Trans. Amer. laryng. rhin. otol. Soc.*, 48, 1942, 144-150.
Discussion of the necessity for complete diagnosis in the case of the symptom of hoarseness.

166. Paget, R., Discussion on functional disorders of the voice. *Proc. roy. Soc. Med.*, 32, 1939, 452-453.
More attention should be paid to the action of the false cords in voice production; they may be operative in distinguishing voiced from unvoiced consonants in whispered speech.

167. Palmer, M. F., A new technic in the correction of persistent falsetto voice in the male. A report on two cases. *J. Speech Dis.*, 5, 1940, 364.
Patients are instructed to phonate with the head hyperextended; resulting vowel is of normal pitch and persists with normal head position.

168. Peacher, G., Contact ulcer of the larynx. I: history. *J. Speech Dis.*, 12, 1947, 67-76.
History of contact ulcer is traced from 1858. Jackson first mentioned it as a clinical entity in 1928.

169. Peacher, G., Contact ulcer of the larynx. III: etiological factors. *J. Speech Dis.*, 12, 1947, 177-178.
The primary etiological factor in contact ulcer was found, in 16 patients, to be vocal misuse.

170. Peacher, G., Contact ulcer of the larynx. IV: a clinical study of vocal re-education. *J. Speech Dis.*, 12, 1947, 179-190.
Contact ulcer is reported amenable to treatment by vocal re-education without surgery.

171. Peacher, G., and Holinger, P., Contact ulcer of the larynx. II: the role of vocal re-education. *Arch. Otolaryng., Chicago*, 46, 1947, 617-623.
Treatment by vocal re-education proved considerably more effective than surgical removal followed by a period of silence.

172. Peacher, W. G., Speech disorders in World War II: IX. dysphonia. *Arch. Otolaryng., Chicago*, 46, 1947, 282-292.
Complete discussion of dysphonia with attention to etiology, examination and therapy.

173. Perepel, E., On the physiology of hysterical aphonia and mutism. *Int. J. Psycho-Anal.*, 11, 1930, 185-192.
Complete report of the psychoanalysis of a woman with hysterical aphonia.

174. Peroni, A., Contact ulcer of the larynx. *Arch. Otolaryng., Chicago*, 17, 1933, 741-746.
Ulcer may be formed as a result of vocal abuse through coughing accompanying tuberculosis.

175. Platt, J. H., Myasthenia laryngis: a case report. *J. Speech Dis.*, 11, 1946, 187-188.
Intensive exercise or complete vocal rest can not be used to treat this problem; effective exercises and regime of therapy are given.

176. Poe, D. L., Further studies of rhinolalia aperta. *Arch. Pediat.*, 50, 1933, 147-157.
After tonsillectomy, efforts to speak are accompanied by pain; children learn that pain is reduced by not using the soft palate; nasality results.

177. Poe, D. L., Rhinolalia aperta after tonsillectomy. *Laryngoscope, St Louis*, 38, 1928, 778-784.
Discussion of therapy methods to relieve nasality resulting from removal of tonsils and adenoids.

178. Pollack, D., Post arytenoidectomy voice therapy. *Speech*, 16, 1952, 4-7.
Arytenoidectomy is used to relieve bilateral abductor paralysis of the vocal cords; voice therapy is necessary after this operation.

179. Powers, H. W., Hoarseness. *J. Kans. med. Soc.*, 39, 1938, 413-417.
Review of more common causes of hoarseness. Contact ulcer is difficult to diagnose and is frequently mistaken for something else.

180. Pronovost, W., Research contributions to voice improvement. *J. Speech Dis.*, 7, 1942, 313-318.
Discussion of research findings in: breathing, pitch level, breathiness, tonal initiation; pitch, loudness, and duration exercises.

181. Pryor, W. R., A practical consideration of alterations of the voice. *Ky. med. J.*, 32, 1934, 415-418.
Discussion of the significance of hoarseness. Complete vocal rest is needed for cases of laryngitis, contact ulcer, vocal nodes.

182. Raymond, E. M., What the government is doing for soldiers with speech defects. *Quart. J. Speech Educ.*, 7, 1921, 1-5.
Cases of hysterical aphonia are treated by re-education which tries to show the patient where he has failed

to adjust to life properly.

183. Rees, M., Some variables affecting perceived harshness. *J. Speech Hearing Res.*, 1, 1958, 155-168.
The study investigates the effect on perceived harshness of vowels, consonant environment and vowel initiation.

184. Ridpath, R., The falsetto voice. *Laryngoscope, St Louis*, 38, 1928, 469-471.
A discussion of the mechanics involved in the production of falsetto, or eunuchoid, voice.

185. Rinquest, B., Voice training for speech. *Music Teachers Nat. Ass. Proc.*, 32, 1937, 139-141.
Misuse of the voice develops a thick skin on the throat and neck which does not add to attractiveness. This can be eliminated by voice training.

186. Rogers, C. K., Class instruction in voice. *Quart. J. Speech Educ.*, 4, 1918, 222-228.
No good can be accomplished in class work in voice by any direct application of so-called scientific methods.

187. Rogers, C. K., The voice as a revelation of the individual. *Quart. J. pub. Spkg.*, 2, 1916, 229-235.
Voice as the first indicator of personality, considered grossly, should be trained intelligently.

188. Russell, G. O., Etiology of follicular pharyngitis, catarrhal laryngitis, so-called clergyman's throat; and singer's nodes. *J. Speech Dis.*, 1, 1936, 113-122.
Vocal abuse is the primary cause of the title disease. Treatment and preventive measures are discussed.

189. Russell, G. O., Physiological cause of guttural and piercing deaf voices. *Oralism and Auralism*, 8, 1929, 98-104.
The false cords are sometimes approximated through too much tension, causing the true cords to be pushed upwards.

190. Sanford, F. H., Speech and personality. *Psychol. Bull.*, 39, 1942, 811-845.
The phenomenon of personality as expressed through voice has been studied mainly at the level of impression, not quantitatively.

191. Schatz, H. A., The art of good tone-production, with some helpful suggestions. *Laryngoscope, St Louis*, 48, 1938, 656-667.
Lengthy discussion of voice production with suggestions for improvement of poor voice production.

192. Scripture, M. K., Pathology and re-education of speech disorders. *Quart. J. Speech Educ.*, 12, 1926, 148-160.
Small portion of article deals with nine possible etiologies of aphonia.

193. Seiler, C., The injurious effects of forced and unnatural breathing upon voice production, as an art, and upon the health of the individual. *Penn. med. J.*, 29, 1899, 587-591.
Too much pressure destroys the stationary waves in the resonant cavities, thereby lessening the quality and volume of the sound.

194. Shafar, J., Affectations of the voice and speech in diseases of the endocrine system. *Speech*, 3, (2), 1937, 7-9.
Discussion of speech and voice concomitants of endocrine pathology.

195. Sherman, D., The merits of backward playing of connected speech in the scaling of voice quality disorders. *J. Speech Hearing Dis.*, 19, 1954, 312-321.
Playing recordings of voice disorders backwards enhances the validity of severity ratings while it does not affect reliability of ratings.

196. Sherman, D., and Goodwin, F., Pitch level and nasality. *J. Speech Hearing Dis.*, 19, 1954, 423-428.
Lowering the pitch level in cases of nasality has no clinical importance except in isolated cases.

197. Sherman, D., and Linke, E., The influence of certain vowel types on degrees of harsh voice quality. *J. Speech Hearing Dis.*, 17, 1952, 401-408.
High lax vowels are perceived as less harsh than low tense vowels.

198. Silverstein, B., Auditorily induced changes in the vocal attributes of voice defectives. *Speech Monogr.*, 21, 1954, 218.
Auditory masking increases intensity and pitch of the voice while it decreases judged severity of the disorder. This is an abstract of a dissertation.

199. Simon, C. T., and Keller, F., An approach to the problem of 'chest resonance.' *Quart. J. Speech Educ.*, 13, 1927, 432-439.
In chest resonance, the entire thoracic area is a sounding board like that in a piano. Vibrations are forced by the shaking of the cords.

200. Slattengren, H. J. E., Nasal speech. *Quart. J. Speech*, 20, 1934, 542-545.
Therapy for hyponasality consists of nasal blowing exercises, diaphragmatic breathing, and practice with nasal consonants.

201. Sokolowsky, R. R., and Junkermann,

E. B., War aphonia. *J. Speech Dis.*, 9, 1944, 193-208.

Discussion of 116 cases of psychogenic aphonia treated in World War I.

202. Stagner, R., Judgments of voice and personality. *J. educ. Psychol.*, 27, 1936, 272-277.

Mental hygienists may find that a voice clinic may improve the social relationships of problem cases.

203. Stanley, D., The science of voice. *J. Franklin Inst.*, 211, 1931, 405-455.

The mouth should not be used as a resonating cavity, nor should the singer listen to his own voice, for when he hears it, it is too late.

204. Staton, D. E., Dysphonia and aphonia. *Miss. Doct.*, 17, 1940, 427-431.

Differentiation among aphonia hysterica, aphonia spastica, aphonia paranoica, aphonia paralytica, dysphonia spastica, and dysphonia puberum.

205. Stinchfield, S. M., and Dorsey, J., A preliminary classification of speech defect terminology. *Oralism and Auralism*, 5, 1926, 71-78.

Considered are 33 terms to be applied to defects of voice quality.

206. Swift, W. B., Elimination of voice defects following adenoid and tonsil operations. *Volta Rev.*, 18, 1916, 17-18.

The operation itself is often insufficient to restore normal voice; vocal drills are the surest method to secure speedy, permanent relief.

207. Swift, W. B., The hygiene of the voice before debates. *Quart. J. pub. Spkg*, 1, 1915, 114-126.

The professional user of the voice must practice special hygiene of the voice. Specific exercises are given for pitch, intensity, relaxation.

208. Taylor, H. C., Social agreement on personality traits as judged from speech. *J. soc. Psychol.*, 5, 1934, 244-248.

There is a marked degree of social agreement among judges in ascribing a given trait to another on the basis of voice recordings.

209. Thorn, K., 'Client-centered' therapy for voice and personality cases. *J. Speech Dis.*, 12, 1947, 314-318.

The clinician must determine which clients are amenable to this approach; then he must desist from suggestions and directions.

210. Thurman, W. L., The construction and acoustic analyses of recorded scales of severity for six voice quality disorders. *Speech Monogr.*, 21, 1954, 219-220.

Differentiation of dysphonias from normals, and between types of disorders, proved impracticable with the methods employed. This is an abstract of a dissertation.

211. Tilley, H., Chronic hoarseness: its clinical significance, diagnosis and treatment. *Med. J. Aust.*, 2, 1933, 169-174.

Hoarseness at puberty is normal; aphonia can be treated by suggestion and/or shock; treatment of vocal nodes requires prolonged vocal rest plus re-education.

212. Tschiassny, K., 'Necrophonia.' *Arch. Otolaryng., Chicago*, 67, 1958, 643-648.

Laryngeal sounds which may appear as spontaneous post-mortem phenomena result from gas formed by bacteria which invade the respiratory tract after death.

213. Van Dusen, C. R., A laboratory study of the metallic voice. *J. Speech Dis.*, 6, 1941, 137-140.

Female metallic voices show preponderance of energy in the first partial, little energy in the higher partials; males show little in first partial, greater energy in high partials.

214. Villarreal, J. J., Consistency of judgements of voice quality. *South. Speech J.*, 15, 1950, 10-20.

Findings contribute to an attitude of mistrust in the speech therapist as he decides on remedial program for the voice defective.

215. Voelker, C. H., Frequency of hoarseness due to phonation with the thyroarytenoid lips. *Arch. Otolaryng., Chicago*, 36, 1942, 71-78.

Phonation can occur as a result of false cord vibrations; this voice can even be used for singing with proper training.

216. Voelker, C. H., Phonetic difficulties in learning English. *Quart. J. Speech*, 20, 1934, 539-542.

As a result of the social taboo in China against opening the mouth in public, Chinese have difficulty in pronouncing English without nasality.

217. Voelker, C. H., Phoniatry in dysphonia ventricularis. *Ann. Otol., etc., St Louis*, 44, 1935, 471-473.

The false cords may supply an unpleasant, rumbling-like sound to normal phonation. Therapy methods are presented.

218. Voelker, C. H., Rhinophonia macrostaphyla. *Ann. Otol., etc., St Louis*, 47, 1938, 659-665.

Discussion of this organic defect characterized by nasality. The velum is hypertrophied so that it articulates with the epiglottis.

219. Voorhees, I. W., Caring for the voice. *Musical Quart.*, 12, 1926, 32-39.

Periodic physical examinations should be undergone by all persons, particularly singers and other users of the voice.

220. Voorhees, I. W., Management of certain nose and throat disorders in singers and speakers. *Laryngoscope, St Louis*, 33, 1923, 42-52.

A complete laryngological examination to determine the state of health of the mechanism should enter into decision to use the voice professionally.

221. Voorhees, I. W., The nonsurgical treatment of aphonia (hoarseness). *N. Y. St. J. Med.*, 34, 1934, 53-55.

Hoarseness is a symptom, not a disease; therefore, therapy must be aimed at the underlying cause.

222. Voorhees, I. W., Voice fatigue in singers and speakers. *N. Y. med. J.*, 100, 1914, 1064-1066.

Therapy for phonasthenia consists of 20-minute sessions in which five minutes of exercise are alternated with five minutes of rest.

223. Walford, W. G., Functional aphonia in a boy. *Brit. med. J.*, 1, 1887, 676.

Brief report of recurrent functional aphonia in an 11-year-old in whom the voice returned naturally and suddenly.

224. Ward, G. W., Hysterical aphonia *Chicago med. J. Examiner*, 34, 1877, 496-505.

The luxurious and lazy habits peculiar to a certain class among the wealthy are conducive to the development of hysteria.

225. Watkyn-Thomas, F. W., Hoarseness. *Practitioner*, 137, 1936, 681-690.

Complete vocal rest is best treatment for any kind of hoarseness. Sudden hoarseness happens as a result of hemorrhage or direct trauma.

226. Watson, W. R., Aphonia—the report of three cases. *Arch. Otolaryng., Chicago*, 4, 1926, 46-50.

Summary of the etiology of aphonia such as tuberculosis, syphilis, benign or malignant tumors, paralysis, embolism, shock or neuroses.

227. Waugh, J. M., The significance of chronic hoarseness in adults. *Int. Clin.*, 3, 1929, 60-67 (39th series).

Because of the various pathologies which can produce hoarseness, differential diagnosis is important.

228. Wells, W., The significance of hoarseness. *Ann. Otol., etc., St Louis*, 49, 1940, 99-112.

Therapy must include relaxed phonation as well as surgery, if the latter is indicated.

229. West, R., The function of the speech pathologist in studying cases of dysphonia. *J. Speech Dis.*, 3, 1938, 81-84.

Discussion of the normal attributes of voice. Any deviation from normal standards may be considered defective.

230. White, F. W., Some causes of hoarseness in children. *Ann. Otol., etc., St Louis*, 55, 1946, 537-542.

All changes in the voices of children at puberty should not be regarded as normal; lasting ill-effects may be caused at that time.

231. Wilkins, J. L., A case of functional phonasthenia. *Speech*, 12 (2), 1948, 13-14.

The primary cause of this case of prolonged adolescent voice change was probably acute anxiety during puberty.

232. Williamson, A. B., Diagnosis and treatment of 84 cases of nasality. *Quart. J. Speech*, 30, 1944, 471-479.

Tension, inhibited oral activity, and distorted resonance are factors in many cases of nasality.

233. Williamson, A. B., Diagnosis and treatment of 72 cases of hoarse voice. *Quart. J. Speech*, 31, 1945, 189-202.

Throat tension resulting from too low a pitch is a major cause of hoarse voices.

234. Wilson, H. L., and Dawson, W. R., Office management of speech problems. *Arch. Otolaryng., Chicago*, 67, 1958, 387-389.

Four cases are presented to show how voice defects resulting from erroneous pitch can be alleviated by Froeschels' chewing method.

235. Winkelman, N. W., Diagnosis and treatment of hysterical aphonia and the diagnosis of malingering in these cases. *Med. Clin. N. Amer.*, 21, 1937, 1211-1220.

As a general rule, the malingerer is not eager for medical examination, whereas the hysteric usually welcomes study.

236. Winslow, P. V., Functional aphonia.

N. Y. med. J., 109, 1919, 1129-1130.

Aphonia is treated by inserting the finger down to the epiglottis; when patient reacts by grunting, the finger is removed and the patient is reminded that he phonated at the time of the examination.

237. Wolf, G. D., Dysphonia: its significance and management. *J. Amer. med. Ass.*, 89, 1927, 263-268.

A diagnosis of functional hoarseness should be made only when organic disease can be excluded with a fair degree of certainty.

238. Woodbury, F., Cases illustrative of treatment of different forms of aphonia due to laryngeal lesions. *Philadelphia Polyclinic*, 7, 1898, 435-436.

Presentation of cases of aphonia resulting from laryngeal neoplasm, laryngeal hemorrhage and acute laryngitis.

239. Woodman, De G., and Pollack, D., Bilateral abductor paralysis. The postoperative care and speech therapy following arytenoidectomy. *Laryngoscope, St Louis*, 60, 1950, 832-839.

A high percentage of postoperative arytenoidectomies with only a unilateral vocal cord fixation will have acceptable voices after proper therapy.

240. Woodruff, G. H., Contact ulcer of the larynx. *J. Amer. med. Ass.*, 106, 1936, 1562.

Report of a case of surgically removed ulcer which recurred several weeks later because of failure to remove vocal abuse as the cause.

241. Wyatt, G. L., Voice disorders and personality conflicts. *Ment. Hyg., London*, 25, 1941, 237-250.

Emotion is expressed through the voice. Vocal exercises may increase patient's libidinal interest in his own voice.

242. Young, I. B., The foundation of voice. *Oralism and Auralism*, 6, 1927, 39-42.

A set of exercises, centering on breathing, is given for general voice improvement. Imagery is used for proper tension of involved muscles.

243. Zerffi, W. A. C., Functional vocal disabilities. *Laryngoscope, St Louis*, 49, 1939, 1143-1147.

Many functional voice disturbances start in infancy. The birth cry is necessarily forced and this type of phonation may persist.

244. Zerffi, W. A. C., Voice re-education. *Arch. Otolaryng., Chicago*, 48, 1948, 521-526.

Internal muscles of the larynx operate in normal phonation; however, external muscles may operate in forced phonation under vocal abuse.

KANSAS STATE UNIVERSITY LIBRARY
AUG 10 1959
MANHATTAN, KANSAS

Abstracts

Phillip A. Yantis, *Editor*

Anatomy and Physiology

BÉKÉSY, G. v., Synchronism of neural discharges and their demultiplication in pitch perception on the skin and in hearing. *J. acoust. Soc. Amer.*, 31, 1959, 338-349.

Experiments involving the role of volleys in the sensation of pitch on the skin indicate that this sensation is influenced by summation and inhibition of a large group of end organs. A sort of 'demultiplication' in neural discharge rate is suggested. *(B. A. Landes, Texas Technological College)*

BLOM, S., and SKOGLUND, S., Some observations on the control of the tongue muscles. *Experientia*, 15, 1959, 12-13.

The authors present some conclusions on the controversy surrounding the proprioceptive innervation of the tongue. They hold the view that the 'proprioceptive innervation of the intrinsic tongue musculature is not arranged in the same manner as in ordinary striated musculature.' *(D. A. LaRusso, University of Washington)*

DRAPER, M. H., LADEFOGED, P., and WHITTERIDGE, D., Respiratory muscles in speech. *J. Speech Hearing Res.*, 2, 1959, 16-27.

Electromyographic study of various respiratory muscles was carried on during spontaneous speech in several forms. The external intercostals were studied by means of both surface and needle electrodes; internal intercostals were studied by means of needle electrodes; latissimus dorsi, rectus abdominis, internal oblique, and external oblique were studied by both surface and concentric-needle electrodes. The diaphragm was studied by means of leads contained in a thin tube which the subjects swallowed; the tube was adjusted so that the leads were essentially on the diaphragm at the esophageal hiatus. Results are discussed in terms of a schematic form from which predictions can be made of muscular activity as an accompaniment to various glottic pressures during speech, various loudness levels, and various volumes of air in the lungs. *(B. A. Landes, Texas Technological College)*

FAABORG-ANDERSON, K., and EDFELT, A. W., Electromyography of intrinsic and extrinsic laryngeal muscles during silent reading activity. *Acta otolaryng., Stockh.*, 49, 1959, 478-482.

During 'silent speech' an increase in electrical activity was found in the vocal and the mylohyoid muscle. In the posterior crico-arytenoid muscle there was a reduction in electrical activity. The change in electrical activity was considerable in subjects with low reading ability. *(Authors' precis)*

FERNANDEZ, C., SINGH, H., and PERLMAN, H., Effect of short-term hypothermia on cochlear responses. *Acta otolaryng., Stockh.*, 49, 1959, 189-205.

'. . . Resistance of cochlear microphonics and neural components of asphyxia increased as temperature dropped. This observation indicated that the oxygen reserve in tissue and circulating blood was sufficient to prolong the survival of the generators of cochlear microphonics and neural components when their metabolic rate was reduced.' *(R. C. Bilger, University of Michigan)*

GALAMBOS, R., and RUPERT, A., Action of the middle ear muscles in normal cats. *J. acoust. Soc. Amer.*, 31, 1959, 349-355.

From wires permanently implanted in the round window of cats, a continuous voltage output was available from unanesthetized animals. By comparing the response of one normal ear with the other ear in which the muscles had been severed, several conclusions were drawn. The middle ear muscles (of which the stapedius is the more important) do not affect absolute sensitivity, contract rapidly after intense stimulation, attenuate transmission from middle-frequency tones, and protect the ear against

---

Phillip A. Yantis (Ph.D., University of Michigan, 1955) is Instructor and Audiologist, Department of Otolaryngology, University of Michigan Medical Center.

damage from intense sounds. *(B. A. Landes, Texas Technological College)*

GOLDSTEIN, M. H., Jr., KIANG, N. Y-S., and BROWN, R. M., Responses of the auditory cortex to repetitive acoustic stimuli. *J. acoust. Soc. Amer.*, 31, 1959, 356-364.

'Electrical responses to low-intensity repetitive clicks and bursts of noise were recorded from the cat auditory cortex. Responses decrease in size as the repetition rate is increased, and for rates higher than 50/sec are smaller than the 'ongoing' activity of the cortex and become difficult to detect visually. An electronic average response computer was used to detect responses to high rates of stimulation. Stimulus-locked responses to clicks and bursts of noise were found for rates up to 200/sec in unanesthetized cats, but only up to 100/sec after anesthetization.' *(Authors' precis)*

KRMPOTIC, J., Datos anatómicos e histopatológicos relativos a los efectores laringo-faringo-bucales. (Anatomic and physiologic data relative to the laryngo-pharyngo-buccal effectors.) *Fono audiológica, Buenos Aires*, 4, 1958, 3-13.

The length of nerves serving various muscles of phonation, divided by the average diameter of axons in each nerve, gives an index to the order of arrival of neural impulses to these muscles; the smaller the quotient, the quicker the arrival. In order of indices (small to large) of their motor nerves, the muscles activated in succession should be: posterior belly of the digastric; internal pterygoid, sternocleidomastoid and cricothyroid; mylohyoid and infrahyoid; cutaneous muscles of the lips; and finally the intrinsic muscles of the larynx. This order implies that the muscle tone of the various speech muscles is set before any vocal emission from the larynx. It is postulated that some defects in phonation can be attributed to disorders in normal succession of arrival of neural impulses to the muscles of phonation. *(R. Goldstein, Jewish Hospital of St. Louis)*

PETERSON, G. E., Some observations on speech. *Quart. J. Speech*, 44, 1958, 402-412.

Some theories, research, and hypotheses concerning respiration, phonation, nasalization, and articulation are presented, pointing up the complexity of human speech. Spectrograms of speech produced by paralyzed patients are shown and related to the thesis that the syllable is the physiological unit of speech. The contribution of the vocal folds to vowel contrasts is illustrated. The high sound pressure level in the nasal cavity during oral speech-sound production is demonstrated. Intelligibility of discrete elements of speech-consonants only, vowels and transitions only, and transitions with neutral vowels only is discussed. *(Maryjane Rees, Sacramento State College)*

SHAMES, G. H., and ULRICH, J. H., A film of velo-pharyngeal closure. *Penn. Speech Ann.*, 15, 1958, 33-37.

A sound motion picture of velo-pharyngeal activity was photographed through the right orbit of a patient who underwent radical facial surgery. Portions of the soft palate during some speech and non-speech are illustrated with stills from the film. The highest elevation of the soft palate was observed in drinking, whistling and blowing. Since only medium elevation was noted during speech, and the muscle activity differed from the sphinteric action observed during blowing, the validity of blowing exercises in speech therapy is questioned. A critique of the photographic method is presented. *(A. J. Berlin, Pennsylvania State University)*

TASAKI, I., and SPYROPOULOS, C. S., Stria vascularis as source of endocochlear potential. *J. Neurophysiol.*, 22, 1959, 149-155.

It is well known that, when a recording microelectrode is pushed into the endolymphatic space of the cochlea of a guinea pig or cat, the potential at the tip of the electrode rises 70-90 mV. above the potential level in the perilymphatic space. Although the ionic composition of the endolymph is unique among various body fluids because of its high potassium content, the DC potential in the cochlear endolymph seems to be maintained by some oxidative process in the cochlea rather than by a difference in ions between the perilymph and endolymph. The present investigation dealt with the anatomical localization of the source of the endocochlear potential. It was concluded that the DC potential in the cochlear endolymph is produced by the cells in the stria vascularis. *(M. Nelson, Michigan State University)*

WUSTROW, F., Los principios anatomicos de los movimentos de las cuerdas vocales.

(Anatomical principles of the movement of the vocal cords.) *An. Fonol. Audiol.*, 2, 1958, 231-236.

The vocal muscles are part of the thyro-crico-arytenoid muscle system and consist of muscle fascicles which are parallel in the abducted position. When the vocal folds are in position for phonation the thyro-vocal portion of the vocal muscle is in a crossed position under the thyro-muscular portion, thus giving a twisted appearance to the muscle fibers. Fibers of the vocal cords radiate into the vocal muscle and not vice versa. During phonation the arytenoid cartilages are separated from their articulation with the cricoid cartilage as they are pulled forward. *(R. Goldstein, Jewish Hospital of St. Louis)*

General

BAKES, F. P., Notater Fra Norge. *Penn. Speech Ann.*, 15, 1958, 28-32.

Norway has about 90 certified speech therapists, working mostly on a part-time basis in the public schools. A one-year training course for speech therapists may be taken at a special school. An audiologic institute located in a government hospital has the responsibility for calibrating all audiometers and certifying all models of hearing aids, as well as testing difficult hearing cases. Norway has a number of schools for the deaf and a Cerebral Palsy Association. *(A. J. Berlin, Pennsylvania State University)*

BINDON, D. M., Make a picture story (MAPS) test findings for rubella deaf children. *J. abnorm. (soc.) Psychol.*, 55, 1957, 38-42.

The MAPS Test was administered to three groups of 15-year-old children: 36 rubella-deaf, 15 nonrubella-deaf and 30 normal-hearing children. The rubella deaf and the nonrubella deaf did not differ when compared on normal and schizophrenic signs. Similar comparison of the deaf group as a whole with the nondeaf control led the authors to conclude that the fantasy productions of the deaf are indicative of social isolation and 'illogical, unrealistic thinking.' Results of these studies tended to show that rubella-deaf children do not differ in personality characteristics as measured by the MAPS Test from children who have defective hearing from other causes, though as a group deaf children differ in personality characteristics from hearing children. *(J. G. Sheehan, University of California)*

CARCO, P., Conferenza introduttiva. (Introductory conference.) *Riv. Audiol. Prat., Milano*, 7, 1958, 11-20.

The author presents an analysis of the nature of noise from the standpoint of professional audiologists. A general survey of the research in progress is also presented. *(D. A. LaRusso, University of Washington)*

CORUZZI, C., La prevenzione della patologia da rumore nell' industria. (The prevention of noise pathology in industry.) *Riv. Audiol. Prat., Milano*, 7, 1958, 129-134.

The author feels that prevention of noise pathology should be a basic concern of the industrial physician. Proper isolation of noisy tasks, adequate sound proofing of physical surroundings and proper instructions to workers should constitute part of the physician's responsibility in this regard. Regular physical examinations of exposed workers are necessary. *(D. A. LaRusso, University of Washington)*

GLORIG, A., Current research in industrial noise. *Noise Control*, 5, 1959, 32-35, 74.

As a result of interviews with approximately 25 current researchers in the field of noise, the author presents a summary of current research progress in the areas of noise measurement, noise exposure control, auditory effects of noise exposure, and non-auditory effects of noise exposure. *(B. A. Landes, Texas Technological College)*

HARDY, W. G., and PAULS, M. D., Atypical children with communicative disorders. *Children*, 6, 1959, 13-16.

The authors indicate some of the difficulties inherent in the use of traditional classification in terms of communicative problems. They suggest that a historical label does little justice to the complexities encountered in the various breakdowns in a sensory-motor continuum. Rather than considering the child's communicative confusions as entities, insightful recognition and handling are required as part of the total picture of his multiple problems. *(B. B. Schlanger, West Virginia University)*

INTRONA, F., Considerazioni medico-legali sulla protezione assicurativa della sordita

da humori. (Medical-legal consideration on insurance protection for noise deafness.) *Riv. Audiol. Prat., Milano*, 7, 1958, 75-86.

Information is offered regarding the history and developments attending the inclusion of noise deafness as an insurable risk for most industrial workers. *(D. A. LaRusso, University of Washington)*

JONGKEES, L. B. W., and V. D. VEER, R. A., On directional sound localization in unilateral deafness and its explanation. *Acta otolaryng., Stockh.*, 49, 1959, 119-131.

The role of head movements in auditory localization, with emphasis on their contribution to localization in unilateral deafness, is discussed. *(R. C. Bilger, University of Michigan)*

KODMAN, F., LIEBERMAN, L., BYERS, V., and FARQUHARSON, C., Some implications of hearing defective juvenile delinquents. *Except. Child*, 25, 1959, 54-67.

The hearing acuity of 306 institutionalized juvenile delinquents ranging from 10 to 20 years was studied in respect to two levels of intensity, 15 db and 30 db. Twenty-four per cent had a 15-25 db loss at one or more frequencies in either ear, and 18 per cent had a 30 db or greater loss. The latter exceeded the national estimate of five per cent for a comparable age group. The variables of age, sex and race did not significantly relate to hearing loss. The authors contend that defective hearing is probably a by-product of the influences that affect the delinquent. *(E. H. Nober, Adelphi College)*

LEWIS, D. G., Bilingualism and nonverbal intelligence: a further study of test results. *Brit. J. educ. Psychol.*, 29, 1959, 17-22.

The possible relationship between bilingualism and intelligence was studied by comparing results on the Jenkins Nonverbal Scale of Mental Ability between 10-year-old English speaking children with Welsh language backgrounds and a group of similar age with English speaking backgrounds. The bilingual group was about eight I.Q. points below the monoglots. *(F. Robinson, Miami University)*

LIAMINA, G. M., K voprosu o mekhanizme ovladenia proiznosheniem slov u detei vtorogo i tretiago goda zhizni. (On the mechanism of learning correct pronunciation of words by two-year-old children.) *Vopr. psikhol., Moskva*, 6, 1958, 119-130.

The development of correct pronunciation does not depend primarily on auditory ability to single out syllables, but on the skill of regulating and adjusting the movements of the speech-motor apparatus to the pattern of words the child hears. A more perfectly functioning hearing analyser plays a positive role but cannot secure correct pronunciation. Before two years of age a child with normal hearing may have imperfect forms of speech reactions, distortion in pronunciation and an uncertainty in filling out the contours of words by sounds. The cause of this fault lies in the imperfection of the speech-motor apparatus and in its immaturity and malfunctioning. The author concludes: (1) it is necessary to utilize the hearing apparatus for developing correct speech reactions at an early age; (2) the use of voiced words must be a part of systematic work on speech —a sort of 'speech-gymnastics'—and words must be familiar to the child and simple in their sound composition; (3) it is necessary to talk to the child without haste and to have in mind that the time of his reactions is longer than that of an adult; and (4) as the child progresses, attention should be given to his grammatical development of phrases together with phonetic perfection in pronunciation. The author investigates the complex nervous processes underlying speech-motor development versus other activities, such as his physical motions, manipulation of various objects, *etc. (B. V. Morkovin, University of Southern California)*

PESTALOZZA, G. Costanti e variabili nella sordità professionale. (Constants and variables in occupational deafness.) *Riv. Audiol. Prat., Milano*, 7, 1958, 75-86.

In any medical consideration of occupational deafness, there are two major points of concern: (1) a program of hearing conservation and (2) a program of exact diagnosis and medical-legal evaluation of hearing loss. The author discusses the constant and variable factors which must be considered in setting up one or both of these programs. *(D. A. LaRusso, University of Washington)*

SNOW, W. B., Sound-level surveys for hearing conservation. *Noise Control*, 5, 1959, 93-97, 128.

The author, a consulting engineer, outlines in detail his method of conducting

noise surveys in industrial situations. Included are descriptions of equipment, procedure, data record forms, and comments on final reports. *(B. A. Landes, Texas Technological College)*

Woods, Sister F. J., and Carrow, Sister M. A., The choice rejection status of speech-defective children. *Except. Child*, 25, 1959, 279-283.

A sociometric test employing the criteria of play, work and friendship was given to 1524 elementary school children in grades 2-5 inclusive; 96 of these children had speech defects. The speech-defective children had significantly lowered choice-rejection scores for the criteria of play and friendship, but not for work. Sex and the severity of the speech problem did not significantly relate to the low scores. Stutterers were better accepted by their peers than children with articulatory defects. None of the stutterers were classified as 'severe'. *(E. H. Nober, Adelphi College)*

Zaoli, G., La sordità professionale nei lavoratori del telefono: considerazioni medico-sociali. (Occupational deafness among telephone workers: some socio-medical considerations.) *Riv. Audiol. Prat., Milano*, 7, 1958, 139-156.

Among the various forms of occupational deafness, that experienced by telephone workers appears most typical. Discussion is presented on methods of selecting personnel, eliminating traumatizing signals, and the adaptation of acoustic filters to instruments in regular use. *(D. A. LaRusso, University of Washington.)*

Pathology

Barbara, D. A., Neurosis in speaking. *Psychoanal. Rev.*, 44, 1957, 41-50.

The author feels that in order to understand the speaker it is essential that we comprehend his personality. He considers some basic differences between healthy speakers and neurotic speakers and describes predominant types of neurotic speakers in a threefold classification: (1) 'The Man of a Few Words' who communicates at the 'spectator level,' who removes himself from the conflicting situation by assuming the attitude of an onlooker, a resigned, colorless speaker; (2) 'The Master's Voice,' the expansive speaker who feels that he is the last word, dogmatic, garrulous, stubborn and insensitive to the listening environment; (3) 'The Voice of the Timid,' or the self-effacing speaker, who experiences his environment as potentially dangerous and so develops a basically helpless, anxious, fearful approach, showing a stutter-like speech, and adapting himself to a vocabulary of compliancy. For healthy speech the author suggests that energies should be directed toward speaking and not to the situation of the individual's fears and attitudes toward the situation. *(J. G. Sheehan, University of California)*

Beyn, E. S., Peculiarities of thought in patients with sensory aphasia. *Lang. and Speech*, 1, 1958, 233-249.

'This paper makes an attempt to characterize the intellectual peculiarities of patients with sensory aphasia. Long and detailed observation of more than 50 patients has shown that the most important factor in these cases is the inability to differentiate between speech sounds. This in turn affects other language levels, semantic, syntactic and grammatical, and also the personality and intellectual activity of the patients. The effects of aphasia on these features and on the comprehension of speech and the active speech behavior of the patients are described.' *(Author's precis)*

Blakeley, R. W., Erythroblastosis and perceptive hearing loss: responses of athetoids to tests of cochlear function. *J. Speech Hearing Res.*, 2, 1959, 5-15.

The results of recruitment and aural-harmonic tests administered to 20 athetoids with erythroblastosis-based hearing losses warrant the conclusions that the deafness involved in these cases is cochlear while vestibular function remains essentially normal. The severity of hearing loss in these cases cannot be predicted on the basis of the severity of the athetosis. *(B. A. Landes, Texas Technological College)*

Courville, C. B., Antenatal and paranatal circulatory disorders as a cause of cerebral damage in early life. *J. Neuropathol.*, 18, 1959, 115-140.

The author discusses the cerebral lesions originating in early life which are the evident causes of cerebral palsy, mental deficiency and epilepsy. The findings of animal investigations pertinent to the dis-

cussion are presented and discussed. *(B. S. Street, Minneapolis)*

GREINER, G., KLOTZ, G., WACKENHEIM, CHAMPY, M., and ROOS, L'atrophie cérébrale et son dépistage par l'encéphalographie fractionnée. (Cerebral atrophy and its determination by fractional pneumoencephalography.) *Ann. Oto-laryng.*, 76, 1959, 58-67.

The authors feel that cerebral atrophy has been neglected as a possible cause of tinnitus. They describe several cases with tinnitus and hearing loss, in which the application of fractional pneumoencephalography revealed cerebral atrophy. Steps in neurological treatment are outlined, and improvement is illustrated with audiograms of the Lüscher and Weber tests. *(R. W. Albright, Arizona State University)*

GUNDERSEN, T., Paracusis Willisii. *Acta oto-laryng., Stockh.*, 49, 1959, 499-508.

Sixteen subjects with paracusis Willisii were examined by means of pure-tone and speech audiometry in both quiet and noise. The author concludes that this phenomenon is the result of talkers with normal hearing raising their voices in the presence of noise rather than to an increased ability of the patient with paracusis Willisii to hear in noise. *(R. C. Bilger, University of Michigan)*

MCCABE, B. F., and LAWRENCE, M., The effect of intense sound on the non-auditory labyrinth. *Acta otolaryng., Stockh.*, 49, 1959, 147-157.

Prompted by reports of transient vestibular disturbances in jet-engine workers, speculation has arisen concerning the action of loud sounds upon the non-auditory labyrinth. Guinea pigs were exposed to very intense noise (136-150 db SPL). Histological examination showed that the saccule was damaged while the other vestibular structures remained normal. The function of the saccule is considered. *(R. C. Bilger, University of Michigan)*

MAZAHERI, M., Statistical analysis of relation of paternal and maternal ages, birth rate and heredity in cleft lip and cleft palate deformities. *Cleft Palate Bull.*, 8 (2), 1958, 5-6.

The records of 630 families having members with cleft lip and/or palate were reviewed to discover the relationship of the appearance of the cleft to parental age, birth rank and reproductive efficiency. Among the conclusions are: (1) cleft lip and/or palate occurs more frequently in males, and the difference in sex is more pronounced in the severest forms; (2) no significant relationship was discovered between differences in age of mother and father and frequency of birth of children with clefts; (3) a significant tendency was found for the probability of birth of child with cleft to increase with increase of age of mothers; (4) clefts occurred significantly more frequently in later birth ranks independent of relationship of maternal age; (5) no comparable relationship with paternal age was found; and (6) the role of heredity is indicated by the greater than expected incidence of relatives with clefts, which becomes even greater when more than one sibling in a family has a cleft. *(A. J. Berlin, Pennsylvania State University)*

MOTTA, G., and PROFAZIC, A., Il trauma acustica professionale. (Occupational acoustic trauma.) *Riv. Audiol. Prat., Milano*, 7, 1958, 21-62.

The authors discuss the nature of acoustic trauma experienced by certain industrial workers who were examined at the Audiological Center of the Otolaringological Clinic in Bologna. Those aspects of the problem specifically analyzed include: (1) Characteristic Pure Tone Audiograms, (2) Characteristic Speech Audiograms, (3) Recruitment, and (4) Prophylaxis for Noise Deafness. The authors conclude, in part, that (1) characteristic audiograms show a deficiency in the 3000-6000 frequency range; (2) the auditory damage is in proportion to the intensity of the traumatizing noise; (3) among boilerworkers, diplacusis emerges most rapidly during early exposure and becomes progressively worse as work experience increases; and (4) there is insufficient clinical or audiometric data to determine whether subjects with tympanic lesions are more or less susceptible to noise injuries. *(D. A. LaRusso, University of Washington)*

NOHRSTROM, P. H., and ANDERSON, B. D., A functional cephalometric radiographic investigation of the nasal and oral pharyngeal structures during deglutition in operated cleft palate and non-cleft palate persons. *Oral Surg.*, 12, 1959, 142-155.

By means of cephalometric radiography

a comparative study is made of the movement of the nasal and oral pharyngeal structures in persons with operated cleft palate and in persons without cleft palate. Deglutition and phonation of the sound [p] are the functional performances used. *(A. K. Kaires, U. S. Navy)*

PRINGLE, M. L. K., and TANNER, M., The effects of early deprivation on speech development: a comparative study of four year olds in a nursery and in residential nurseries. *Lang. and Speech*, 1, 1958, 269-287.

'Two groups of preschool children, matched for age, sex, intelligence and home background, were given a battery of verbal tests and their conversations were recorded during periods of free play. Data were obtained on vocabulary and sentence structure under controlled and spontaneous conditions, on the children's ability to understand and express themselves in simple sentences and on verbal expression in social intercourse. In all quantitative comparisons, the nursery school children were found to be in advance of the children in residential nurseries. Among qualitative differences noted, was the extent to which speech was used for establishing social contacts with contemporaries and for obtaining adult attention. Although there was considerable overlap in the achievements of the two groups, our evidence confirms that there is some retardation in the language skills of preschool children in care.' *(Authors' precis)*

SPRIESTERSBACH, D. C., and POWERS, G. R., Nasality in isolated vowels and connected speech of cleft palate speakers. *J. Speech Hearing Res.*, 2, 1959, 40-45.

Recordings of isolated vowels and connected speech were made with 50 cleft palate children. The recordings were played backwards to judges who rated them in terms of severity of nasality. Correlations of .47 to .60 were found between judged degree of nasality in connected speech and severity of nasality for isolated vowels. Although certain individuals deviated markedly from the group, the high vowels were more nasal than the lower vowels, and front vowels were more nasal than back vowels. *(B. A. Landes, Texas Technological College)*

WYATT, G. L., A developmental crisis theory of stuttering. *Lang. and Speech*, 1, 1958, 250-264.

'The relationship between mother and child has been considered as the inter-personal matrix within which the development of language in children occurs. Processes of successful language learning and of developmental deviations have been analyzed within this framework. Stuttering has been interpreted as the result of a crisis in language learning coincident with a crisis in the relationship between mother and child. The general hypothesis is that a disruption of reciprocal identification between mother and child, occurring at the time when the child is in the practising stage of early grammatical speech, results in the child's inability to master language learning, expressed in a regression to earlier forms of language behavior. An experimental study was designed to test four operational hypotheses derived from the theory. This study has implications for research in symbolic learning occurring within an interpersonal matrix, and also for therapy with stuttering children and their mothers.' *(Author's precis)*

Psycho-Acoustics

POLLACK, I., Binaural communication systems: preliminary examination. *J. acoust. Soc. Amer.*, 31, 1959, 81-82.

'The principle of a communication system which purchases additional channels by shifting selective operations from equipment to human operators is examined. For selected conditions, the system may perform adequately for low-priority communications.' *(Author's precis)*

POLLACK, I., and JOHNSON, L. B., Reproduction and identification of elements of auditory displays. *J. acoust. Soc. Amer.*, 31, 1959, 7-8.

'The identification of the frequency of a tone was examined under four training procedures. The training procedures attempted to determine whether identification of tonal frequency could be improved by attaching distinctive motor responses to elements of the display. For relatively short training periods, such procedures were little more effective than simply providing verbal information of the correctness of the identification.' *(Authors' precis)*

ROSENBLÜT, B., BILGER, R. C., and GOLDSTEIN,

R., Electrophysiologic responses to sound as a function of intensity, EEG pattern and sex. *J. Speech Hearing Res.*, 2, 1959, 28-39.

On the basis of data obtained from simultaneous electrodermograms and electroencephalograms on normal hearing adults, a criterion was developed for estimating auditory threshold from these responses. Accurate estimates were made more often for males than for females and more often from the EDR than the EER. *(B. A. Landes, Texas Technological College)*

Scharf, B., Critical bands and the loudness of complex sounds near threshold. *J. acoust. Soc. Amer.*, 31, 1959, 365-370.

'The loudness of multitone complexes and bands of white noise was measured as a function of band width at levels between five and 35 db above threshold. . . . As the sensation level is raised up to 35 db, the spreading of energy becomes more and more advantageous to loudness. The critical band defines the limits within which the spreading of energy leaves the loudness of a complex sound unchanged. The widths of the critical bands that were measured in these experiments on loudness summation below 35 db are approximately the same as those measured in experiments on loudness summation at higher levels and also in experiments on phase, threshold, and two-tone masking.' *(B. A. Landes, Texas Technological College)*

Sherrick, C. E., Jr., Effect of background noise on the auditory intensive difference limen. *J. acoust. Soc. Amer.*, 31, 1959, 239-242.

Using a method similar to that developed by Riesz, DLs were studied in terms of effects of random background noise. Three frequencies, three intensities, and four S/N ratios were employed in one experiment, and one frequency, four intensities and four S/N ratios in a second experiment. In the first experiment employing amplitude modulation, 'analysis of the data revealed only signal-to-noise ratio as a significant factor affecting the DL.' In the second experiment employing loudness matching, a lack of systematic shift of the DL was found. *(B. A. Landes, Texas Technological College)*

Warren, R. M., Sersen, E. A., and Pores, E. B., A basis for loudness judgments. *Amer. J. Psychol.*, 71, 1958, 700-709.

Experiments were conducted to test the hypothesis that judgments of related loudness are based upon experience with the manner in which sound changes with distance. Recorded speech and a 1000-cycle tone were the stimuli used in testing the influence of quality cues upon twice-distance and half-loudness judgments of subjects. The data supported the proposed theory both quantitatively and qualitatively. *(B. B. Schlanger, West Virginia University)*

Rehabilitation

Aram, A., and Subtelny, J. D., Velopharyngeal function and cleft palate prostheses. *J. prosth. Dent.*, 9, 1959, 149-158.

The authors discuss 'speech aids' designed for patients with cleft palates. Normal velopharyngeal closures of various age groups were studied by cephalometric means to determine the approximate level of closure. The importance of the recognition of growth changes in the level of the velopharyngeal closure is stressed, particularly when considering the proper positioning of a prosthetic pharyngeal extension. *(A. K. Kaires, U. S. Navy)*

Beder, O. E., Carrell, J., Coe, H. E., and Moore, A. W., The problem of the premaxilla in bilateral cleft lip and cleft palate. *Oral Surg.*, 12, 1959, 156-164.

'Patients presenting with clefts involving the premaxilla required the combined planned efforts of the various disciplines of a cleft-lip and cleft-palate team. The habilitation procedure at different periods may involve plastic surgery, speech therapy, orthodontics, oral surgery, restorative dentistry, or prosthodontics. The treatment plan at any phase should attempt to augment that of another phase that may be indicated later; therefore, it must be long range in scope.' *(Authors' precis)*

Clerc, P., and Sterkers, J. M., Etude comparative des aspects cliniques audiométriques et anatomiques de l'otospongiose. (A comparative study of clinical aspects, audiometric and anatomic, of otosclerosis.) *Ann. Oto-laryng.*, 76, 1959, 43-50.

A statistical analysis of 632 cases operated for otosclerosis is made on the basis of preoperative prognosis and the various operative procedures used. The Fowler type of mobilization yielded a gain in 88 per

cent of the cases in which it was used. The Rosen technique provided a gain of 78 per cent, fracture of both branches of the footplate, 54 per cent, and footplate fenestration, 45 per cent. *(R. W. Albright, Arizona State University)*

CRAWLEY, E. F., Television and the hearing handicapped. *Hearing News*, 26 (1), 1958, 3-4.

KAHO, E. E., This is lipreading on TV. *Hearing News*, 26 (3), 1958, 7-8, 18.

These two articles describe lipreading lessons by television in Wisconsin and Denver. Work leading to creation of programs, content and annotated research plans are included. *(A. J. Berlin, Pennsylvania State University)*

ENGLISH, R. H., Speech improvement and the speech therapist. *West. Speech*, 23, 1959, 36-41.

A pattern for setting up and operating a speech improvement program combined with speech therapy, the nature and purposes of such a program, and lesson materials are discussed. *(Maryjane Rees, Sacramento State College)*

Hearing aids of the eyeglass and contour types. *Consum. res. Bull.*, 42 (1), 1959, 16-20.

Some advantages, some disadvantages and some false advertising of eyeglass and contour hearing aids are discussed. Ten eyeglass-type aids bearing six different brand names and three contour-type aids are described and evaluated with respect to appearance, case design and fit, quality of sound, distortion and noise level. No description is given of the manner of testing and comparing the instruments. *(W. L. Thurman, Eastern Illinois University)*

KATZ, L., Learning in aphasia patients. *J. Consult. Psychol.*, 22, 1958, 143-146.

The author set out to test the hypothesis that in aphasic patients the normally more effective goal-directed learning situation is not significantly more effective than the incidental learning situation. The author tested 25 'predominantly expressive' male aphasic patients between the ages of 19 and 51 on two equivalent series of postage stamps, with instructions to evaluate the stamp aesthetically. The testing was divided into two conditions, the incidental learning situation and the goal-directed learning situation. Retention of the material was tested and scores of the aphasics were compared with those obtained by a control group of 25 male nonaphasics. Results indicated that the nonaphasics performed significantly better with goal-directed than with incidental instructions, while the aphasics had a higher mean score in the incidental learning situation. The author suggests that the aphasic's greater experience with failure might react with anxieties which interfere with their performance in the goal-directed situation. The author interpreted his results as confirming the initial hypothesis. *(J. G. Sheehan, University of California)*

KODMAN, F. JR., and PATTIE, F. A., Hypnotherapy of psychogenic hearing loss in children. *Amer. J. clin. Hypnosis*, 1, 1958, 9-13.

'Clinical hearing tests were made of a small sample of children who showed nonorganic hearing losses. Despite the fact that their ability to hear was essentially normal, they complained of inability to hear in certain situations in the home and in the classroom. To investigate this phenomenon, periodic laboratory measurements were made of their hearing before and after hypnotherapy. The results indicate that quantitative improvement was brought about by hypnotherapy in every case except one. Symptom substitution was not demonstrated and the hearing behavior improved as desired. . . .' *(P.A.Y.)*

MAWHINNEY, C. K., To isolate or not to isolate in speech therapy. *Except. Child*, 25, 1959, 247-255.

Many educators have criticized the speech therapist for his analytic method of isolating a speech sound during diagnosis and therapy. Their argument is based on the assertion that the synthetic approach is more successful for reading training. The author, defending the isolation technique, accentuates the difference between the term 'phonics,' which relates only to the application of phonetics for teaching reading, and the term 'phonetics,' which is employed by the speech therapist to designate the science of speech sounds. The author contends that the processes of speech and reading are very different. Auditory recognition, discrimination and speech therapy require the isolation of a sound so it can be perceived

and subsequently corrected by the student. *(E. H. Nober, Adelphi College)*

MILLARD, D. R., Preservation of natural landmarks in unilateral cleft lip. *J. Amer. med. Ass.*, 169, 1959, 133-134.

The author describes his operative techniques in the repair of cleft lip. He emphasizes attention to the components of a normal lip and nose which are present before surgery and describes (with a diagram) an incision and suture procedure. He gives brief attention to postoperative care and timing of the operation. *(W. L. Thurman, Eastern Illinois University)*

MILLER, A. A., MCCAULEY, J. M. FRASER, C., and CUBERT, C., Psychological factors in adaptation to hearing aids. *Amer. J. Orthopsychiat.*, 29, 1959, 121-129.

Adjustment to hearing aids is discussed from the point of view of the ego's problem in adaptation. Positive or negative motivation may involve utilitarian, cultural or intrapsychic motives. An adequate therapeutic approach within this frame of reference might include individual orientation to an aid, 'supportive' therapy, group therapy and individual psychotherapy. *(F. Robinson, Miami University)*

MORIMITSER, K. J., A review of prosthetic therapy of the cleft palate patient. *Cleft Palate Bull.*, 8 (2), 1958, 7-10.

After a brief historical survey of the development of prosthetic devices for cleft palate habilitation, some current principles of prosthetic construction—particularly the placement of the pharyngeal section—are reviewed. *(A. J. Berlin, Pennsylvania State University)*

NEWBY, H. S., School hearing conservation programs. *Hearing News*, 26 (5), 1958, 9-14, 16-20, 22.

This discussion of school testing procedures includes descriptions of individual screening tests (sweep, one- or two-frequency method), group screening tests ('fading numbers,' Massachusetts test), diagnostic tests, suggestions to teachers for discovering loss without an audiometer, medical and educational recommendations (speechreading, auditory training, speech training, preferential seating, special classes and psychological counseling). *(A. J. Berlin, Pennsylvania State University)*

O'NEILL, J. J., and STEPHENS, M. C., Relationships among three filmed lip-reading tests. *J. Speech Hearing Res.*, 2, 1959, 61-65.

A comparative study of lip-reading test films of Mason, Utley, and Morkovin shows that the scores made by hard-of-hearing subjects on the Mason correlate significantly with scores on the other two tests, but that the scores from the Utley and Morkovin do not correlate. Teacher ratings of lip-reading abilities of their students correlate significantly with scores on all three tests. *(B. A. Landes, Texas Technological College)*

RITTMANIC, P. A., Hearing rehabilitation for the institutionalized mentally retarded. *Amer. J. ment. Def.*, 63, 1959, 778-783.

A hearing survey of 1220 patients in an institution for the mentally retarded found that 40.5 per cent had hearing losses which were significant. A hearing conservation program that was established is outlined. Criteria for subjects for aural rehabilitation are indicated and several illustrations of benefits derived from hearing aid use by selected subjects are included. *(B. B. Schlanger, West Virginia University)*

SMOKLER, J., Prosthetic aid for the cleft palate. *J. Amer. dent. Ass.*, 58, 1959, 123-125.

A case report is presented of a patient with a cleft palate. The construction of a prosthetic appliance is described. *(A. K. Kaires, U. S. Navy)*

STRENG, A., Public school programs for children with impaired hearing in small school systems. *Excep. Child*, 25, 1958, 71-76.

A questionnaire survey of services available to hard of hearing children in communities of 80,000 or less was structured in terms of detection, diagnostic services, therapeutic services, and the incidence of hearing loss in each community. No two programs were alike nor did any two attack the problem in the same way. The author offers concrete suggestions for developing adequate programs in small communities. *(E. H. Nober, Adelphi College)*

TATO, J. M., and ARCELLA, A. I., La comprension de la palabra del sordomudo desmutizado. (Comprehension of the speech of the orally educated deaf person.) *Fono audiológica*, 4, 1958, 23-31.

From a group of 20 alumnae of an oral

school for the deaf, the 10 whose speech was most intelligible were chosen to record lists of disyllabic words. The recordings were evaluated by five sophisticated listeners who were not familiar with the speech of the deaf. Intelligibility increased in 11 successive sessions from 19.6 per cent to 48.0 per cent. There was no further increase in intelligibility in the next six listening sessions. *(R. Goldstein, Jewish Hospital of St. Louis)*

WOLF, E. G., Prosthetic design — past and present. *Penn. Speech Ann.*, 15, 1958, 38-42.

Types of cleft palate prosthetic devices from the sixteenth century to the present are described and evaluated. *(A. J. Berlin, Pennsylvania State University)*

Speech Science

BLACK, J. W., Equally contributing frequency bands in intelligibility testing. *J. Speech Hearing Res.*, 2, 1959, 81-83.

'The purpose of this study was to determine in the manner of French and Steinberg the 20 bands of frequencies that contribute equally to intelligibility scores obtained by the use of multiple-choice tests. . . . In the present study the speakers and listeners who spoke and responded to multiple-choice tests also spoke and heard common monosyllables in the manner of write-down intelligibility testing. The results indicated the 20 bands of frequencies that contribute equally to correct responses in hearing and writing monosyllabic words.' *(B. A. Landes, Texas Technological College)*

HOUSE, A. S., A note on optimal vocal frequency. *J. Speech Hearing Res.*, 2, 1959, 55-60.

Further evidence is presented which tends to destroy confidence in the traditional methods for determining optimum pitch level. *(B. A. Landes, Texas Technological College)*

LEHISTE, I., and PETERSON, G. E., Linguistic considerations in the study of speech intelligibility. *J. acoust. Soc. Amer.*, 31, 1959, 280-286.

'Intelligibility is defined as a property of speech communication involving meaning. Since only meaningful units have normal linguistic distributional properties, only meaningful units have the phonetic properties of actual speech. An auditory intelligibility dialect ratio is defined for a listener relative to a specified message. An analysis is presented of the Harvard PB lists, and a set of 10 lists of 50 monosyllables each is presented having an almost exact first-order phonetic balancing.' *(Authors' precis)*

MYSAK, E. D., Pitch and duration characteristics of older males. *J. Speech Hearing Res.*, 2, 1959, 46-54.

Two groups of elder males (ages 65-79 and 80-92) and one group of middle-aged males (32-62) were studied in terms of pitch and duration characteristics. Results indicate that as age increases, pitch tends to go up, pitch tends to become more flexible, and there is a reduction in magnitude of time measures. Between a group of elder fathers and their middle-aged sons, no significant familial relationships were found in the factors studied. *(B. A. Landes, Texas Technological College)*

PICKETT, J. M., Perception of compound consonants. *Lang. and Speech*, 1, 1958, 288-304.

'The perceptual confusions among English compounds of two consonants were examined. One defined class of syllables, made up of 15 initial compound consonants in conjunction with three vowel sounds [i], [a], and [o], and another class of 15 final compound consonants in conjunction with the same three vowel sounds, were employed. Recorded syllables were played back against a white noise background and against low-frequency noise background. Confusion patterns among the compound consonants depended upon the articulatory dimensions of the individual consonant members which formed the compound. That is to say, there was little evidence of interaction among the members of the compound. The confusion patterns indicated that the low speech frequencies, *i.e.*, those frequencies heard above the white noise, convey the consonant distinction of nasal *vs* glide *vs* stop, and the distinctions among glides. On the other hand, the higher speech frequencies, heard above the low-frequency noise, conveyed the distinction of affrication and the place distinctions among nasals and stops. The different vowels had minor effects on the perception of the consonants adjacent to them.' *(Author's precis)*

POLLACK, I., and PICKETT, J. M., Intelligibility of peak-clipped speech at high noise levels. *J. acoust. Soc. Amer.*, 31, 1959, 14-16.

'The effect of symmetrical speech peak clipping upon speech intelligibility in noise was examined. Over a wide range of conditions, intelligibility is independent of the level of peak clipping if the postclipping speech power is held constant. Peak clipping thus achieves protection of the ear against painful loud speech without demanding a penalty of intelligibility. Indeed, under restricted ranges of conditions, peak clipping may actually improve intelligibility with a constant speech power.' *(Author's precis)*

WANG, W. S-Y., Transition and release as perceptual cues for final plosives. *J. Speech Hearing Res.*, 2, 1959, 66-73.

'The relative significance of various acoustical cues in the perception of final plosive consonants was investigated. Human speech and systematic modifications of it were used as the test stimuli. Suggestions were made in the direction of an absolute scale of measurement for phonetic differences between speech sounds regardless of linguistic code.' *(Author's precis)*

Testing and Measurement

BUTLER, R. A., and GALLOWAY, F. T., Performances of normal-hearing and hard-of-hearing persons on the delayed feedback task. *J. Speech Hearing Res.*, 2, 1959, 84-90.

'The efficacy of a delayed speech feedback measure in differentiating normal-hearing from hard-of-hearing persons was investigated. The subjects were 48 persons with normal hearing and 60 who had mild-to-moderate loss. The results showed that the hard-of-hearing group could be distinguished from the normal-hearing group when the feedback was presented at a moderate intensity level. At a high level, no significant group differences occurred. The advantages and disadvantages of one measure of delayed feedback disturbance as an index of hearing acuity are discussed.' *(Authors' precis)*

CURRY, E. T., and NAGEL, R. F., An evaluation of group hearing test methods. *Except. Child*, 25, 1959, 199-201.

The limitations and inadequacies of currently used group hearing tests are reviewed relevant to their reliability when employed on large groups. In this paper, the ear-choice technique was evaluated as a group test. A hearing loss was considered as a pure-tone loss of 30 db or more in either ear at one or more of the test frequencies (500-8000 cps). Although the ear-choice technique approached Newby's standards of acceptance, it failed to meet the authors' standard of 95 per cent accuracy in detection of hearing-deficient people. The variables of age, sex, grade, ear or frequencies were nonsignificant in affecting the test results. *(E. H. Nober, Adelphi College)*

GOLDBERG, L. R., The effectiveness of clinician's judgments: The diagnosis of organic brain damage from the Bender-Gestalt Test. *J. cons. Psychol.*, 23, 1959, 25-33.

Staff psychologists, psychology trainees and nonprofessional judges made diagnostic judgments from the Bender protocols of 15 organic and 15 nonorganic patients and then indicated their degree of confidence for each of their diagnoses. The three groups of judges did not differ in their ability to diagnose organic brain damage from the Bender, but the nonprofessional judges displayed considerably more confidence in their judgments than did the other two groups. The group as a whole diagnosed above chance level, but the results suggested that the Bender-Gestalt Test used alone for diagnosing organicity is not sufficient. *(B. S. Street, Minneapolis)*

KNOTT, J. R., CORRELL, R. E., and SHEPHERD, J. N., Frequency analysis of electroencephalograms of stutterers and nonstutterers. *J. Speech Hearing Res.*, 2, 1959, 74-80.

'Neurophysiological differences between two groups of stutterers and a comparison group of nonstutterers were investigated in an EEG study, using the Ulett measures. In one stuttering group there was a difference in alpha band activity which seemed to follow the Ulett 'anxiety-prone' group, but this was not true for the other stuttering group. On the basis of the various measures, both stuttering groups differed from the nonstuttering group in one way or another, but the two stuttering groups differed more extensively from each other than from the nonstuttering group.' *(Authors' precis)*

LORENZE, E. J., and SOKLOFF, M. A., Clinical evaluation of speech deficiencies in cerebral

palsy. *Arch. phys. Med.*, 38, 1957, 442-449.

In a study of 192 children referred for cerebral palsy evaluation, ranging in age from one to 15, 94 were spastic, 28 athetotic, 11 ataxic, one showed tremor, three had atonia, and 55 were undifferentiated. Of the children studied, 162 had speech problems—87.9 per cent of the boys and 79.3 per cent of the girls. *(J. G. Sheehan, University of California)*

MEUNARGIIA, R. V., Ob obiektivnom metode issledovania slukha s pomoshchiu elektrokardiografii. (Studies of hearing acuity with the aid of electracardiography.) *Vestnik O.R.L., Moskva*, 4, 1959, 14-19.

The author discusses a unique method of establishing a conditioned reflex to sound for the purpose of appraising hearing acuity. Pressure on a tonsil is used as an unconditioned irritant, and a signal, more intense than the speech reception threshold, is applied as a conditioned stimulus. Cardiac reactions are registered electrocardiographically. A conditioned aurocardiac reflex is formed after four to eight combinations, enabling one to record an objective audiogram. *(B. V. Morkovin, University of Southern California)*

PALVA, T., Masking in audiometry. *Acta otolaryng., Stockh*, 49, 1959, 229-239.

It is shown that interaural attenuation of sound can be increased from the usual 50 db to 70 db by reducing the area under the earphone. An adaptation of a hearing-aid receiver led to maximum interaural attentuation. Some of the principles governing the use of masking in clinical audiometry are discussed. *(R. C. Bilger, University of Michigan)*

PALVARINI, E., L'importanza della soglia del dolore nella diagnosi della sordita professionale. (The importance of the threshold of pain in the diagnosis of occupational deafness.) *Riv. Audiol. Prat., Milano*, 7, 1958, 177-180.

Diagnosis of occupational deafness is a relatively easy process, particularly with the audiometric curve showing characteristic deficiencies in 2048 and 4096 frequencies registered through both air and bone conduction. In the opinion of the author, much more can be done about assuring a greater degree of uniformity in diagnosis. *(D. A. LaRusso, University of Washington)*

SPRIESTERSBACH, D. C., Routine methods of examination and diagnosis of velopharyngeal incompetency — speech aspects. *Cleft Palate Bull.*, 8 (1), 1957, 7-8.

The minimal diagnostic procedures employed by the speech pathologist in evaluating cleft palate problems should include (1) an extensive articulation list, (2) a sample of connected speech, (3) oral pressure measures, (4) lateral head x-rays and (5) a peroral examination. *(A. J. Berlin, Pennsylvania State University)*

TATO, J. M., and ARCELLA, A. I., Por ciento de inteligibilidad de la palabra del sordomudo. (Per cent intelligibility of the speech of the deaf.) *Fono audiológica*, 4, 1958, 14-22.

The intelligibility of isolated words, phrases and questions spoken by 20 deaf girls graduated from an oral school for the deaf was judged by trained normally-hearing listeners. The mean percentage of each correctly identified were: words, 14.6 per cent; phrases 7.8 per cent; and questions 27-42 per cent. *(R. Goldstein, Jewish Hospital of St. Louis)*

ZWISLOCKI, J., PIRODDA, E., and RUBIN, H., On some poststimulatory effects at the threshold of audibility. *J. acoust. Soc. Amer.*, 31, 1959, 9-14.

Poststimulatory threshold shift was measured as a function of duration of test stimuli and time lapse between prime stimulus and test stimulus. Results indicate that the threshold shift depends critically upon the time interval between the prime and test stimuli. *(B. A. Landes, Texas Technological College)*

Book Reviews

Ernest H. Henrikson, *Editor*

BROADBENT, D. E., *Perception and Communication.* New York: Pergamon Press, 1958. Pp. 338. $8.50.

Perception and Communication presents a concise statement of Broadbent's mechanical 'filter' theory of perception (see *Psychol. Rev.*, 1957, 64, 2-5, 214) together with relevant data from several hundred experiments. Although Broadbent has based the theory on an information theory framework, complex mathematical derivations and formulae are not employed in its presentation. He used the inductive approach in the development of the model and as a result the model is qualitative rather than quantitative in form.

Essentially, the model portrays man (or rather his nervous system) as a limited capacity channel making it necessary that some selective operation be performed on the input to the channel. A mechanical 'filter' is postulated which selects what sensed events (inputs) pass through the channel. Most of the experimental evidence presented deals with the variables affecting the selectivity of the filter and thereby the stimuli to which an individual attends or which he perceives. Examples of such variables are: properties of the physical stimuli, such as frequency, intensity, spatial localization; states or drives of the individual, such as hunger or thirst; and the previous experience of the individual. The model makes provision for a short and a long term information store and is able to account for much of the experimental evidence concerned with memory. The long term store is connected to the selective 'filter' by a sort of feedback loop, thereby enabling stored information to influence the selection of stimulus events and thus an individual's perception.

The book makes an important contribution by discussing the available evidence in the light of the 'filter' theory and contrasting it with other theoretical approaches. Evidence from various experiments in a certain field of interest, generalizations about the evidence and various theoretical interpretations are presented in each chapter. Those interested in auditory communication and certain aspects of attention in operator performance will be interested especially in the chapters concerned with hearing and behavior, multi-channel information handling, the effects of noise on behavior, vigilance, and the shifting of attention. There are several chapters of more general interest regarding broader psychological problems which deal with individual differences, selective learning, extinction, memory and skill. A final chapter summarizes the assumptions of the model and contrasts the logic behind its development with the more positivistic approach of such psychological theorists as Clark L. Hull.

WILLIAM E. MONTAGUE
U. S. Navy Electronics Laboratory

CANFIELD, NORTON, *Hearing, a Handbook for Laymen.* New York: Doubleday and Co., 1959. Pp. 214. $3.50.

This book, written by the eminent otologist Norton Canfield, M.D., is the first in a new layman's handbook series on disease and abnormal health conditions. The author has truly achieved his objective of making a complicated field understandable to the reader who has no special background either in otology or audiology. Medical terms are for the most part avoided and when included they are explained in everyday language. Hearing losses are explained in terms of the impaired functioning of the individual. No reference is made to such complicated matters as the decibel notation, the frequency range necessary to understand speech, *etc.* The information given is readable and comprehensive. The first three chapters describe hearing handicapped individuals and their problems, gives general information and discusses the measurement of hearing and categorization of hearing losses. Chapter

Ernest H. Henrikson is Professor of Speech and Director of the Speech and Hearing Clinic at the University of Minnesota.

four is devoted to an excellent and detailed discussion of the causes of hearing losses and much practical information regarding prevention of hearing loss. Succeeding chapters discuss special problems of children and adults, what can be done otologically to improve hearing, tinnitus, the selection and use of hearing aids, individual techniques used in rehabilitation, the hearing rehabilitation center, the problem of noise, adjustment of the family to the hearing handicapped individual, geriatric otology and audiology, and organizations and publications to help the hearing handicapped.

The author's information with respect to nonmedical problems is for the most part accurate. However, cerebral palsy and cleft palate are not included when (page 86) he notes that 'Other causes (than hearing) for poor speech development are mental retardation, emotional reactions and aphasia.'

Many audiologists will probably be disturbed by the author's failure to stress what to them is the most important step following otological examination and treatment, namely, the selection of a hearing aid or aids for the individual by a competent audiological service. While hearing centers and university clinics are mentioned, the over-all impression is that it is up to the individual to locate a satisfactory hearing aid for himself, and much advice is given in an effort to help him in this almost impossible task.

A handbook of this sort should serve many useful purposes. It should, through the information it provides, do much toward alleviating the anxiety of the hard of hearing adult; it should provide useful and needed information to parents of hearing handicapped children and it should serve as a source book for teachers, nurses and administrators concerned with the habilitation of the hearing impaired child.

There has been a real need for accurate nontechnical 'information' in this area. This is the first book which not only purports to supply this type of information but actually achieves its purpose.

JANET JEFFERS
Los Angeles State College

HODSON, C. J., and OSWALD, M. V. O., *Speech Recovery After Total Laryngectomy*. Edinburgh: E. and S. Livingstone Ltd., 1958. Pp. 36. $1.50.

This booklet is presented in two parts. The first summarizes the results of cine-radio graphic appraisal of the speech of laryngectomized persons. This includes a complete analysis of how they produce sound. Comparisons are made between the methods used by good and by poor speakers. The second part of the booklet describes the practical application of these research findings to helping laryngectomized persons learn to talk. Pre- and post-operative factors are included. Ten illustrative descriptions of patients conclude the presentation.

The booklet should be required reading for all persons who work with the laryngectomized. It will give them a clear picture of the development and application of a research method for analyzing the mechanism related to the production of esophageal speech. It should cause them to re-evaluate their own procedures, particularly since certain approaches are advocated which are contrary to what is presented in many other therapy manuals. For speech pathologists not particularly concerned with the laryngectomized, this booklet presents a significant research-therapy related pattern which may well be applied to other types of speech problems.

ERNEST H. HENRIKSON
University of Minnesota

RIESE, WALTHER, *A History of Neurology*. New York: MD Publications, 1959. Pp. 223. $4.00.

This comprehensive overview traces doctrines of healthy and disturbed nervous function from the ancients to modern medicine. It is particularly illuminating for speech pathologists because of an outstanding chapter on the history of cerebral localization and aphasia. More importantly, it is recommended because of the author's optimistic and encouraging understanding of patients, knowledge so vital to an intelligent approach for those working in the area of neuropathology.

In his preface, the author rejects factual cataloguing of historical data and projects the task of man as interpreter of neural phenomena. He considers the *function* of the nervous system, clearly set forth as the organ of movement and sensation in time and space. From Galen to acetylcholine (from whole to part) he then leads into the useful but overworked concept of the reflex arc and upward to its even more oversimplified (by some examiners) counterpart, at higher levels, the doctrine of cerebral localization. In this central chapter we are reminded by the author, who is an admirer of J. Hughlings Jackson, that to locate a *lesion* is not to locate *language*. Respect for

man as language user is revealed by a witty sentence from this chapter: 'Man considered as a player on these instruments (brain structures) is majestic; but considered as no more than the sum total of his instruments, man weighs about 170 pounds.'

Chapters on pain, prognosis and therapy complete this challenging and learned text. Of particular interest to rehabilitators in all fields is the author's conviction that 'social cure' has established its place as a concept in our society. 'According to this, a patient may be considered cured or healthy if he is able to fulfill his duties as a citizen, regardless of discomfort or infirmity, making through his work some contribution to society and his own welfare.'

Dr. Riese has written a very informative and gracefully presented history of man's nervous system.

JOHN C. COLLISON
Medical College of Virginia

STREAN, LYON P., *The Birth of Normal Babies*. New York: Twayne Publishers, Inc., 1958. Pp. 194. $3.95.

In this book the author attempts to explain congenital malformations, including palatal defects, stillbirths and abortions on the basis of maternal, medical, traumatic or emotional stress experienced early in pregnancy, *i.e.*, the first trimester. He tries to substantiate his theories by animal experiments and retrospective studies of human cases.

The author proposes that the adrenal glands release excess cortisone when the maternal organism is exposed to stress. Because cortisone is catabolic, he believes the elevated blood levels of this hormone create an abnormal uterine environment which adversely affects the fetus in utero. Depending on the stage of gestation, the defect(s) produced is (are) centered in the structure(s) undergoing differentiation and growth at the time of stress.

Dr. Strean leaves little to the geneticist in the etiology or pathogenesis of anomalies. He believes that heredity has been overplayed and emphasizes that most tragedies occurring in the reproductive process are directly attributable to stress and its sequels —those that he allows to heredity he believes are minor and easily correctable. As a guide to the birth of normal babies he formulates his 'Ten Commandments of Genesis' to help lead expectant mothers through a stress-free pregnancy.

The material presented is interesting, but lacks confirmation in the literature. There are numerous reports of women who received large quantities of cortisone during the period of fetal organogenesis and growth who have delivered normal infants. Retrospective studies often result in erroneous conclusions as exemplified by the recent reports that negate the earlier, accepted, high incidence of congenital anomalies in association with maternal rubella.

Information that stimulates realization of the individual's important role in the reproductive process has definite value. However, the book should be directed primarily toward women contemplating pregnancy rather than expectant mothers as the author intended. In this way, potential, unjustified fears generated by reading this book may be avoided.

RICHARD D. HOCKETT
KONALD A. PREM
University of Minnesota

WHITEHURST, MARY WOOD, *Let's Travel*. New York: Hearing Rehabilitation, 1958. Pp. 60.

Here is an excellent workbook type of text for acoustically handicapped children which has been planned to emphasize vocabulary development through practice in listening, speech reading and speech. It can also be correlated with social studies. It is intended for use with children of approximately 12 to 16 years of age, or older if language is retarded.

The author's philosophy (which is shared by most teachers of the deaf and hard of hearing) is that auditory training, speech reading and speech are not separate subjects in the curriculum but are, rather, tools to promote better communication and should supplement each other. Practice in perfecting these skills is necessary, but the material for the drills should be correlated and used to broaden language development.

The workbook consists of 14 units in which vocabulary development, auditory training, speech reading and speech are integrated around a common core of interest, a travelogue. Some of the cities and countries visited are: London, Paris, Rome, Venice, Germany, Switzerland and Mexico. The vocabulary to be used in the travelogue is introduced and the student's first task is to use the dictionary to find pronunciations and definitions and then to match words and

definitions in the workbook. Various drills are given with the same words, singly and in sentences, using first speech reading, then listening and finally speech. The teacher then reads the travelogue (found in the *Teacher's Manual*). This uses the vocabulary being studied and gives many interesting facts about the country in question. More drills checking comprehension and requiring the use of the words in sentences follow.

The words that have been chosen for study are all highly useful and are not confined to the field of social studies. The author points out that the definitions are, for the most part, restricted to the one meaning used in the context of the travelogue. An attempt has been made in the final unit to indicate other definitions of some of the words. One wishes that more than a single lesson might have been devoted to this extension of meanings.

The material in the lessons is applicable to use with either groups or individuals and also with either deaf or hard of hearing children by choosing the procedures best suited to the situation. The workbook format is liked by children and should provide motivation for study.

Teachers of either deaf or hard of hearing children of the age groups mentioned should find this little book extremely helpful.

MARGARET R. BREAKEY
Burlingame, California, Schools

News and Announcements

Trends

The assistantships, scholarships and fellowships, offered by clinics, colleges and universities, will in the future be listed in *Trends*, the monthly employment bulletin published by the American Speech and Hearing Association. *Trends* is available by subscription. Personal subscriptions for members and associates: single issue, 50¢; 1 year, $3.00; 2 years, $5.00. Subscriptions for organizations: single issue, 75¢; 6 months, $3.00; 1 year, $5.00.

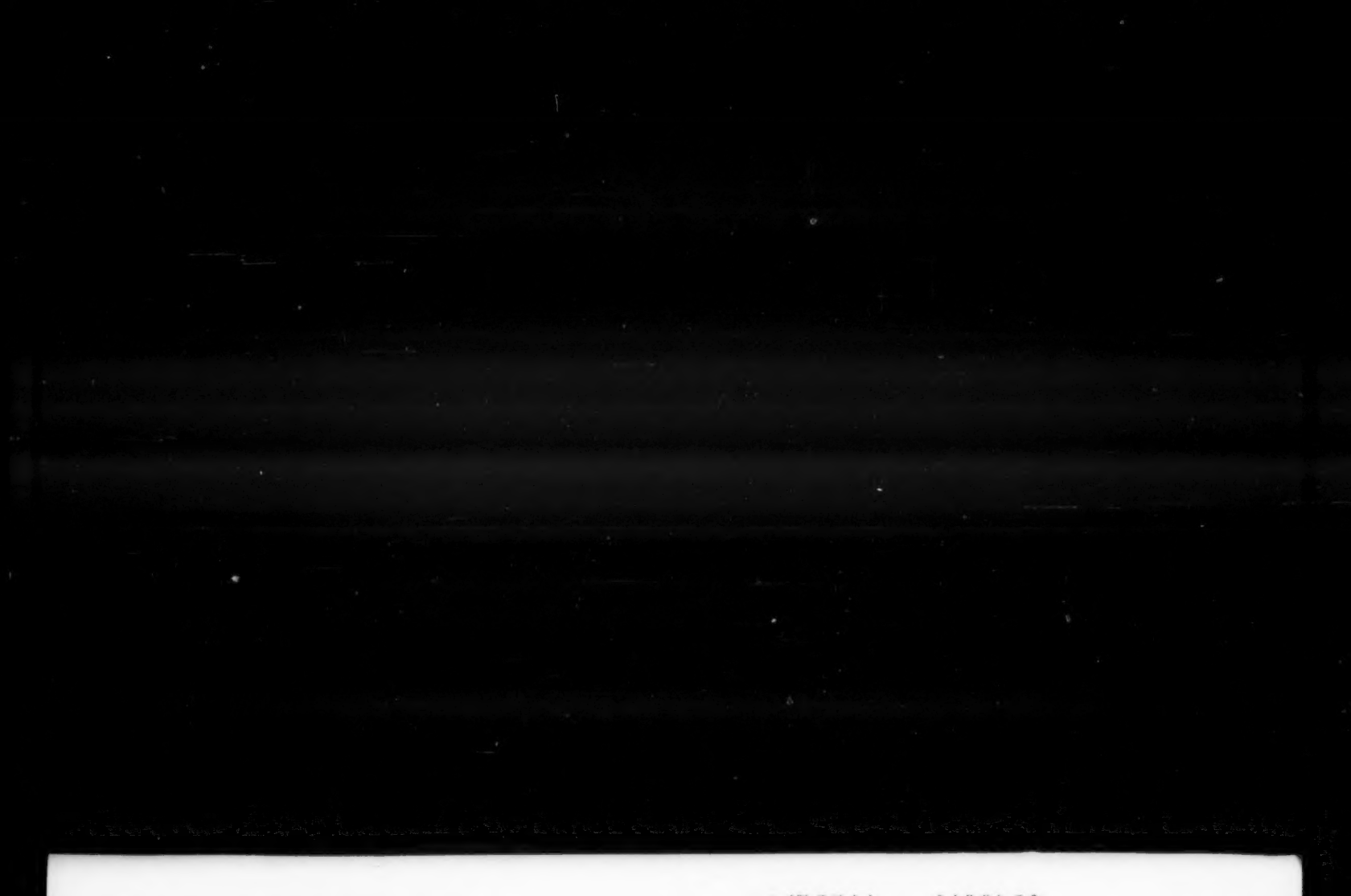
ASHA

Other news and announcements, formerly appearing in this journal, will be included in *ASHA*, the new house journal of the American Speech and Hearing Association. The first issue of *ASHA* will present the Convention Program and many other features of importance to the members of the Association. It will be mailed to all Association members.

Note of Appreciation

The News and Announcements prepared for this issue have been transferred to the new journal, *ASHA*, edited by Kenneth O. Johnson. The editor and staff of the *Journal of Speech and Hearing Disorders* express their appreciation to Severina Nelson and her committee for their excellent contributions to the News and Announcements department during the past two years.

Erratum

The last sentence in the first paragraph, column, 2, p. 119, May 1959 issue of *J. Speech Hearing Dis.*, should read, 'The athetotic patient has difficulty with these sounds also, but can produce them slightly better because of greater facility of breath control, forward tongue movement, lip rounding and velopharyngeal closure.'

MANHATTAN, KANSAS